JVC

SERVICE MANUAL

COMPACT DISC PLAYER

MODEL No. XL-V440BK

COMPACT disc DIGITAL AUDIO

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No.2930
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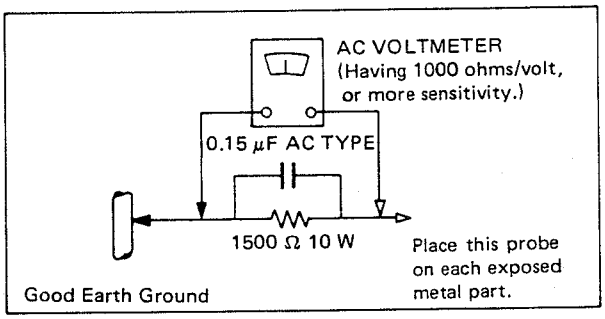
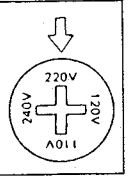
Safety Precaution

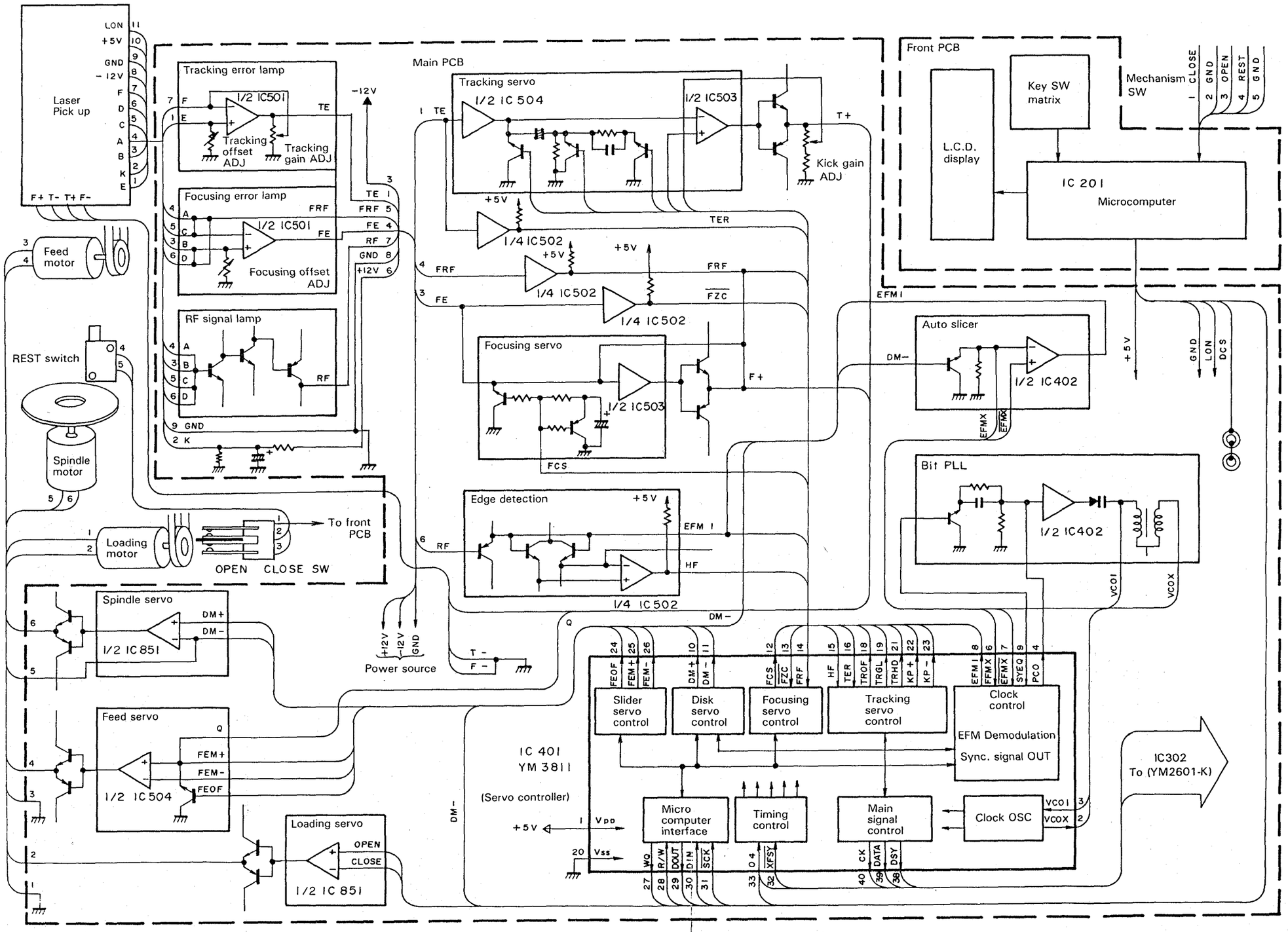
1. The design of this product contains special hardware and many circuits and components specially for safety purposes.
   For continued protection, no changes should be made to the original design unless authorized in writing by the manufacturer. Replacement parts must be identical to those used in the original circuits. Service should be performed by qualified personnel only.
2. Alterations of the design or circuitry of the product should not be made. Any design alterations or additions will void the manufacturer's warranty and will further relieve the manufacturer of responsibility for personal injury or property damage resulting therefrom.
3. Many electriçal and mechanical parts in the product have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in the parts list of the service manual. Electrical components having such features are identified by shading on the schematics and by (⚠) on the parts list in the service manual. The use of a substitute replacement which does not have the same safety characteristics as the recommended replacement part shown in the parts list in the service manual may create shock, fire, or other hazards.
4. The leads in the products are routed and dressed with ties, clamps, tubings, barriers and the like to be separated from live parts, high temperature parts, moving parts and/or sharp edges for the prevention of electric shock and fire hazard.
   When service is required, the original lead routing and dress should be observed, and it should be confirmed that they have been returned to normal, after re-assembling.
5. Leakage current check
   (Electrical shock hazard testing)
   After re-assembling the product, always perform an isolation check on the exposed metal parts of the product (antenna terminals, knobs, metal cabinet, screw heads, headphone jack, control shafts, etc.) to be sure the product is safe to operate without danger of electrical shock.
   Do not use a line isolation transformer during this check.
   - Plug the AC line cord directly into the AC outlet. Using a "Leakage Current Tester", measure the leakage current from each exposed metal part of the cabinet, particularly any exposed metal part having a return path to the chassis, to a known good earth ground. Any leakage current must not exceed 0.5 mA AC (r.m.s.).
   - Alternate check method
     Plug the AC line cord directly into the AC outlet. Use an AC voltmeter having 1,000 ohms per volt or more sensitivity in the following manner. Connect a 1500 Ω 10 W resistor paralleled by a 0.15 μF AC-type capacitor between an exposed metal part and a known good earth ground.
     Measure the AC voltage across the resistor with the AC voltmeter.
     Move the resistor connection to each exposed metal part, particularly any exposed metal part having a return path to the chassis, and measure the AC voltage across the resistor. Now, reverse the plug in the AC outlet and repeat each measurement. Any voltage measured must not exceed 0.75 V AC (r.m.s.). This corresponds to 0.5 mA AC (r.m.s.).


AC VOLTMETER
(Having 1000 ohms/volt, or more sensitivity.)
0.15 μF AC TYPE
1500 Ω 10 W
Place this probe on each exposed metal part.
Good Earth Ground

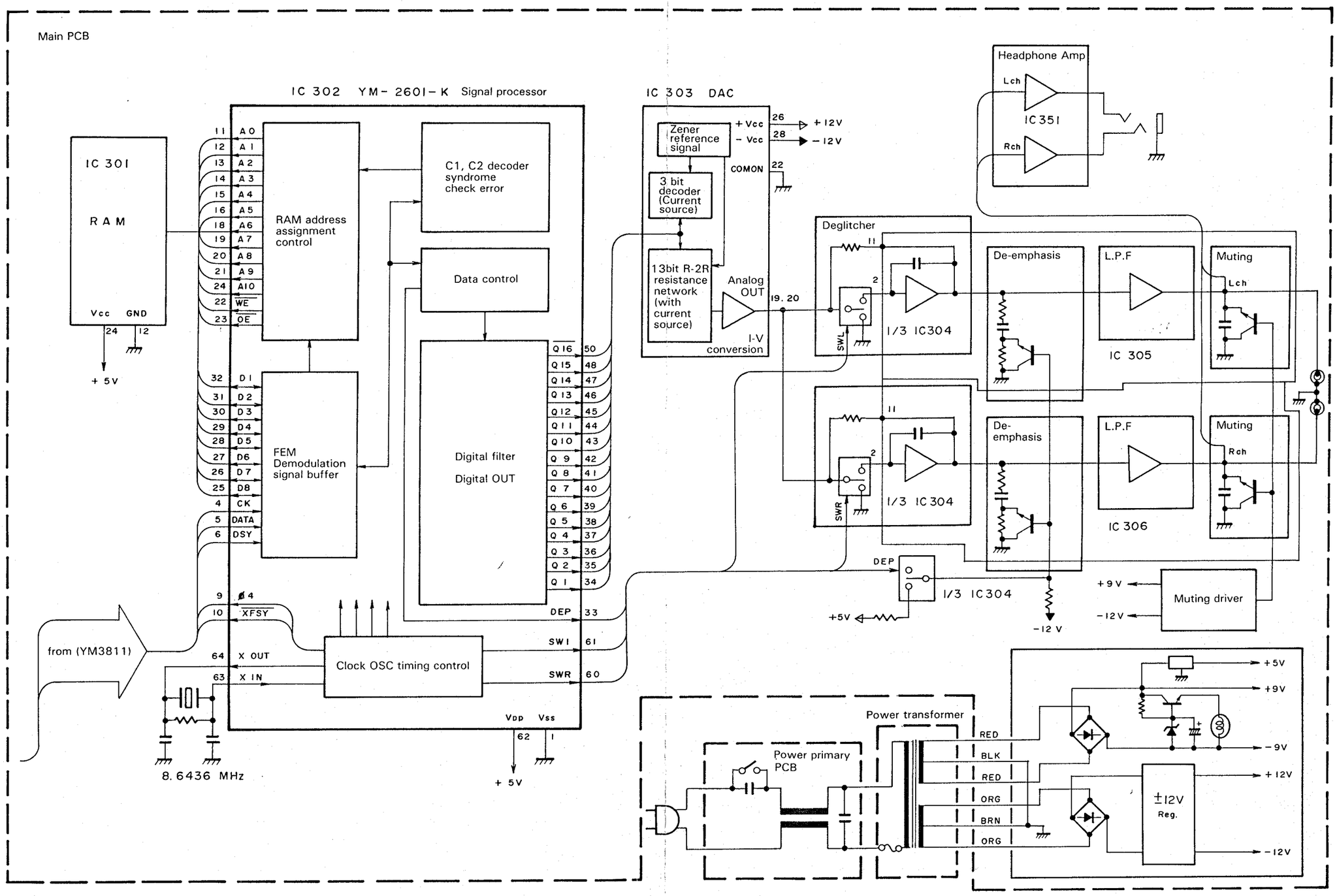
CHECKING YOUR LINE VOLTAGE (Except for U.S.A., Canada, Australia, U.K. and Continental Europe.)
Before inserting the power plug, please check this setting to see that it corresponds with the line voltage in your area. If it doesn't, be sure to adjust the voltage selector switch to the proper setting before operating this equipment. The voltage selector switch is located on the rear panel.
CAUTION: Before setting the "Voltage selector switch" to the proper voltage, disconnect the power plug.



Block Diagram (Servo & Microcomputer Section)



Block Diagram (Audio & Power Souce Section)



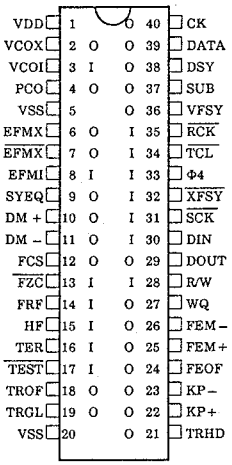
Description of Major LSI ICs

(1) YM3811 (IC401)

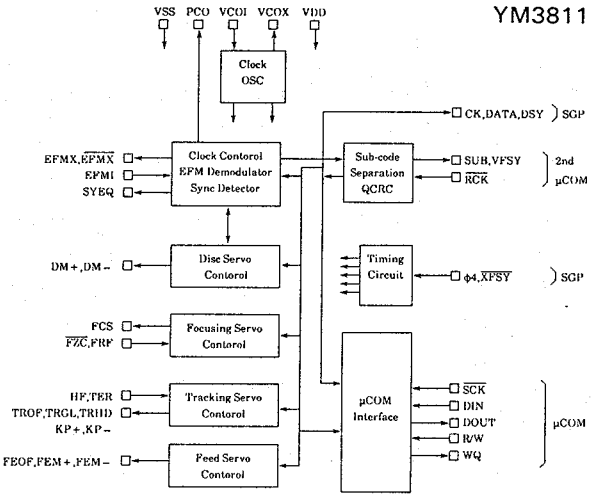
Outline: YM3811 is a silicon-gate CMOS LSI for CD player servo-control used with YM2601 (SGP) for demodulation of EFM signal from photo pickup and various intelligent servo-control functions (focus, spindle, tracking, feed).

Function:
1) Digitizes EFM signal, performes clock regeneration and separates sync. signal.
2) EFM demodulates the digital signal described above and outputs it to YM2601-K (SGP).
3) Separates Q sub code from the digital signal described above and outputs it to the external microprocessor after CRC checking.
4) Outputs frame phase difference signal from regenerated and standard clocks and controls speed of spindle motor.
5) Performs tracking and feed motor servo-controls for music scanning and fast foreard by input of commands from microprocessor.

Terminal layout



Block diagram

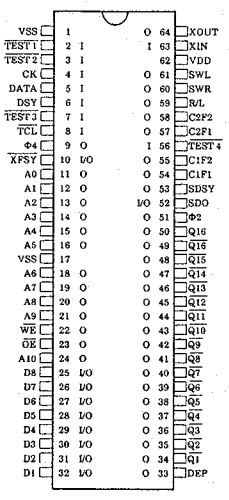


(2) YM2601-K (IC302)

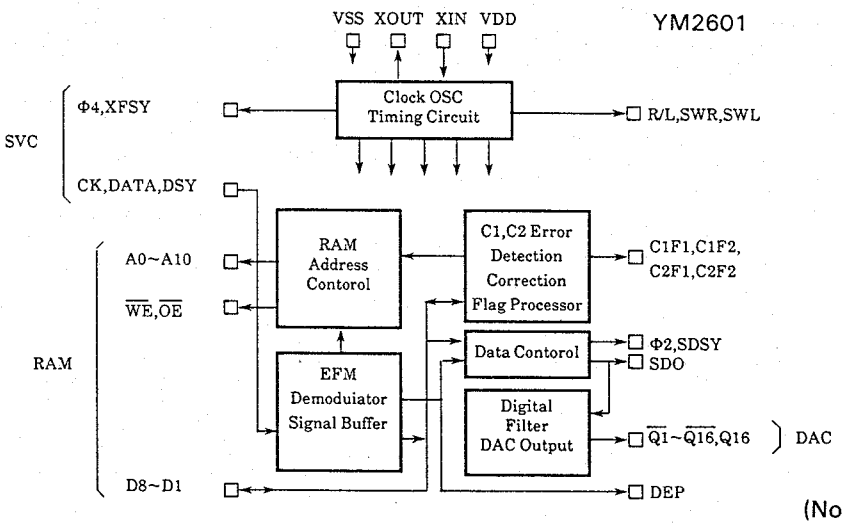
Outline: YM2601 (SGP) is N channel silicon gate MOS LSI for signal processor in CD player.
Performs digital filtering for correction on digital signal and improvement of sound quality; used with YM3811 (SVC).

Function:
1) Generates standard clock oscillations and timing signals necessary for operation with external crystal oscillator.
2) Performs buffering of EFM demodulation signal for absorbing fluctuation in disc speed and exchanges signals with external RAM.
3) Unscrambles and deinterleaves by re-sequenceing digital signal from YM3811 (SVC) into a fixed sequence.
4) Performs the detection and correction of error signals and flag processing (double error correction system).
5) Performs signal interpolation, pre-hold and muting etc.
6) Performs digital filtering (signal cutoff at 20 kHz) by doubling the sampling cycle for each channel L and R to 88.2 kHz and outputs signal for DAC.

Terminal layout



Block diagram



(3) Terminal Functions of YM3811 (IC401)

No. of Terminal	Name of Terminal	I/O	Outline of Function
1	VDD	I	15 V power terminal
2 3	VCOX VCOI	O I	Connect an LC resonance circuit between these two terminals. The terminals are used for performing VCO clock oscillation (Average 8.6436 MHz).
4	PCO	O	Control output terminals for VCO clock. Set up a VCO clock oscillation circuit that raises the frequency, when the average direct current voltage is high between the terminals.
5 20	VSS VSS	I I	Ground terminal
6 7	EFMX $\overline{\text{EFMX}}$	O O	This is an output terminal for amplification limited EFM signals. Connect it to an EFM signal slice level controller circuit.
8	EFMI	I	EFM signals (1 ~ 2 VPP) are input to this terminal.
9	SYEQ	O	This monitor output terminal becomes "H" when synchronizing signal during EFM patterning and the internal synchronizing signal match.
10 11	DM+ DM−	O O	These are PWM terminals connected to the disc motor drive circuit. Both terminals do not become "H" simultaneously.
12	FCS	O	Focus retraction output terminal.
13	$\overline{\text{FZC}}$	I+	This terminal is based on the focus error signal. When the focus point comes, the signal which becomes "L" is input to this terminal.
14	FRF	I	"H" signals are input to this terminal, when it is exposed to reflected light.
15	HF	I	EFM envelope signals (amplitude logic level) are input to this terminal.
16	TER	I	Tracking error signals (amplitude logic level) are input to this terminal.
17 34	$\overline{\text{TEST}}$ $\overline{\text{TCL}}$	I+ I+	A test terminal with built-in pull-up resistor. Non-connected.
18	TROF	O	This output terminal turns off the tracking error signal of the tracking servo circuit.
19	TRGL	O	This output terminal lowers the gain of the tracking servo circuit.
21	TRHD	O	This output terminal holds the tracking error signal of the tracking servo circuit while the KP+ and KP− terminals(below) are performing output operations.
22 23	KP+ KP−	O O	These terminals perform tracking operations and should be connected to the tracking servo circuit.
24	FEOF	O	This output terminal turns off the input signal to the feed servo circuit.
25 26	FEM+ FEM−	O O	These output terminals are used for high-speed feed operations and should be connected to the feed servo circuit.
27	WQ	O	This request output terminal is used for requesting transmission of data from the SVC to the μCOM and should be connected to the μCOM.
28	R/W	I	This output terminal performs switching of data transmission and should be connected to the μCOM. When the R/W terminal is "L", data is transferred from the SYC to the μCOM and in the opposite direction when the terminal is "H".
29	DOUT	O	Connect this data output terminal the μCOM. When R/W is "L", data is transferred from SYC to μCOM according to SCK clock input.
30	DIN	I	Connect this data input terminal to the μCOM. When R/W is "H", data is transferred from μCOM to SYC according to SCK clock input.
31	$\overline{\text{SCK}}$	I	This clock input terminal is essential for data transmission and should be connected to the μCOM.
32	$\overline{\text{XFSY}}$	I	This input terminal for frame synchronizing signals (7.35 kHz) should be connected to the SGP output.
33	ϕ4	I	This input terminal for the quartz clock (4.3218 MHz) should be connected to the SGP output.
35	$\overline{\text{RCK}}$	I+	This clock input terminal is essential for subcode transmissions and should be connected to the μCOM. The terminal is non-connected when not in use.
36	VFSY	O	This output terminal for VCO frame synchronizing signals (Average 7.35 kHz) should be connected to the μCOM. The terminal detects "H" → "L" changes and can be used as a request signal to request transmission of subcode from SYN to μCOM.
37	SUB	O	Connect this subcode output terminal to the μCOM. It transfers the subcode from SYC to μCOM according to RCK clock input.
38	DSY	O	Connect this synchronizing signal output terminal for serial signals (See below) to the SCP input.
39	DATA	O	This is an output terminal for serial signals such as 8-bit EFM modulated and 5-bit control signals. The terminal should be connected to the SGP input.
40	CK	O	Connect this output terminal for the VOC clock (Average 4.3218 MHz) to the SGP input.

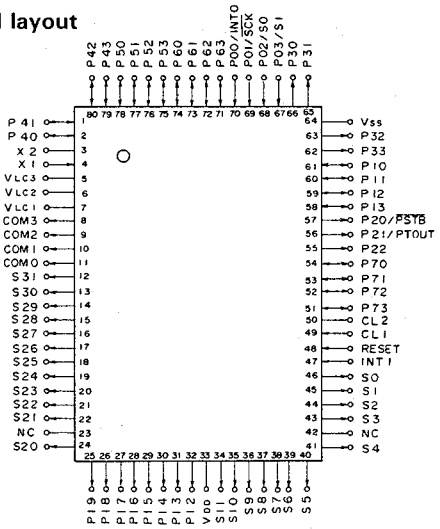
(4) Terminal Functions of YM2601-K (IC302)

No. of Terminal	Name of Terminal	I/O	Outline of Function
1 17	VSS VSS	I I	Ground terminal
2 3 7 8	$\overline{TEST1}$ $\overline{TEST2}$ $\overline{TEST3}$ $\overline{TCL}$	I+ I+ I+ I+	Test terminal with built-in resistor. A non-contact type terminal.
4	CK	I	Connect this VCO clock (Average 4.3218 MHz) input terminal to the SVC output.
5	DATA	I	This is an input terminal for serial signals such as 8-bit EFM modulated and 5-bit control signals. Connect it to the SYC output.
6	DSY	I	Connect this synchronizing signal output terminal for serial signals (See above) to the SYC output.
9	ϕ4	O	Connect this output terminal for the quartz clock (4.3218 MHz) to the SYC input.
10	$\overline{XFSY}$	I/O	Connect this output terminal for frame synchronizing signals to the SYC input. (If the terminal is set to "Level L" during a test, synchronizing signals can be recovered.)
11 12 13 14 15 16 18 19 20 21 24	A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 A10	O O O O O O O O O O O	Connect this address output terminal to the RAM address terminal.
22	$\overline{WE}$	O	Connect this terminal to the RAM WE terminal. At "level L" the RAM is in write mode.
23	$\overline{OE}$	O	Connect this terminal to the RAM OE terminal. At "level L" the RAM is in read mode.
25 26 27 28 29 30 31 32	D8 D7 D6 D5 D4 D3 D2 D1	I/O I/O I/O I/O I/O I/O I/O I/O	Connect this data input terminal to the RAM data terminal. The terminal is in output mode during WE = "L" cycle and in input mode during WE = "H" cycle.
33	DEP	O	An output terminal for frequency characteristic switching signals of the audio filter. De-emphasis is required during "H" mode.
34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50	$\overline{Q1}$ $\overline{Q2}$ $\overline{Q3}$ $\overline{Q4}$ $\overline{Q5}$ $\overline{Q6}$ $\overline{Q7}$ $\overline{Q8}$ $\overline{Q9}$ $\overline{Q10}$ $\overline{Q11}$ $\overline{Q12}$ $\overline{Q13}$ $\overline{Q14}$ $\overline{Q15}$ $\overline{Q16}$ Q16	O O O O O O O O O O O O O O O O O	This terminal serves to output parallel signals that have passed through the built-in digital filter. Connect it to the DAC input. Left and right channels are output alternately at a rate of 88.2 kHz per channel. Connect either Q16 or $\overline{Q16}$ depending on which DAC input is to be used.
51	ϕ2	O	Output terminal for quartz clock (2.1609 MHz)
52	SDO	I/O	Output terminal for DAC serial signals. Signals are output from the LSB at ϕ clock bit rate of 24 bits for right channel and 25 bits for left channel.
53	SDSY	O	Synchronizing signal output terminal for above serial signals. The terminal is "H" during left channel output and "L" during right channel output.
56	$\overline{TEST4}$	I+	A test terminal with built-in pull-up resistor. This terminal is normally a non-contact terminal. If set to "L", it is possible to put serial signals coming from the SDO terminal through the digital filter provided that these signals are identical in format to above serial signals.
54 55 57 58	C1F1 C1F2 C2F1 C2F2	O O O O	This monitor output terminal displays the operating condition of C1 and C2 error-correction.
59	R/L	O	This is an output terminal for channel distribution signals of DAC analog output. Right channel is "H" and left channel is "L".
60 61	SWR SWL	O O	This is an output terminal for deglitch signals for each channel of DAC analog output.
62	VDD	I	A +5 V power terminal
63 64	XIN XOUT	I O	Connect the quartz to these terminals. They are used for performing quartz clock (8.6436 MHz) oscilloations.

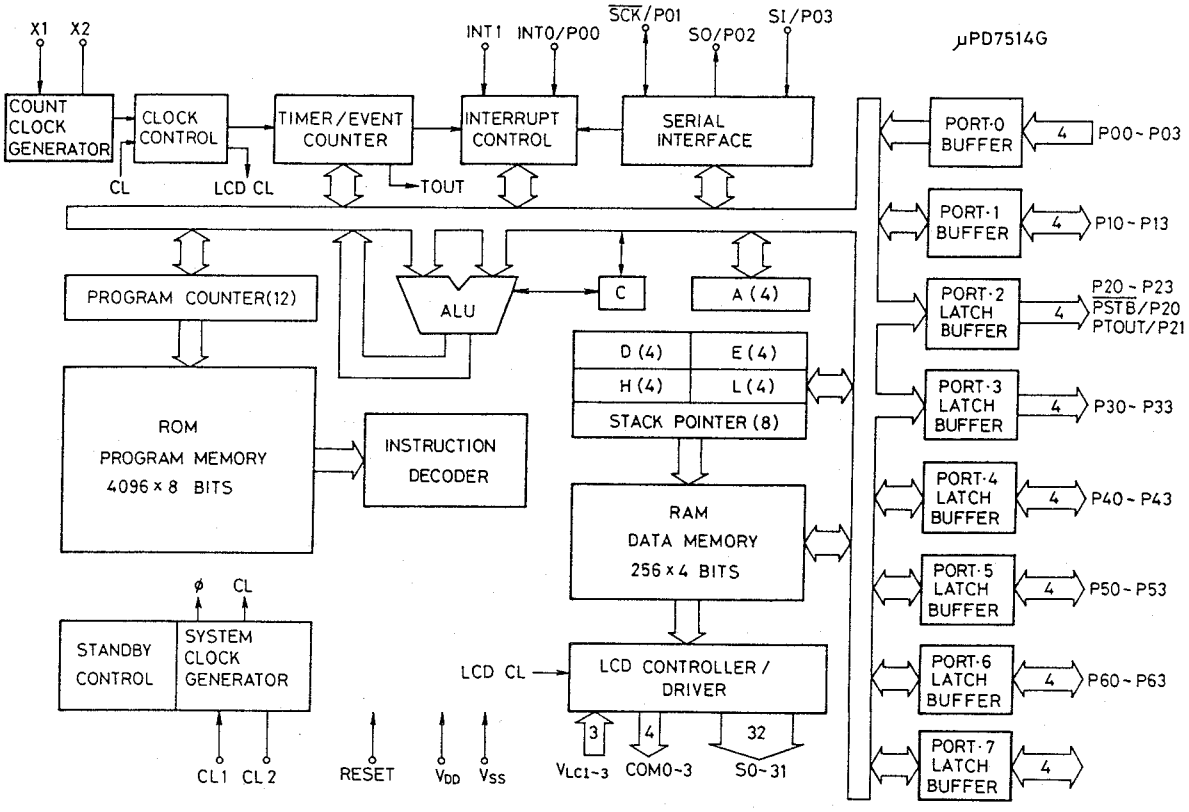
(5) μPD7514G (IC201)

Outline: This IC is C-MOS 4-bit single chip microprocessor with 4096 word × 8-bit ROM, 256 digit × 4-bit RAM, In/Out, Timer/Counter and Serial Interface. The main functions of IC command the operation to LCD drive, servo control, mechanism control, etc. and accept the signal from operation switches.

Terminal layout



Internal block diagram



Key matrix

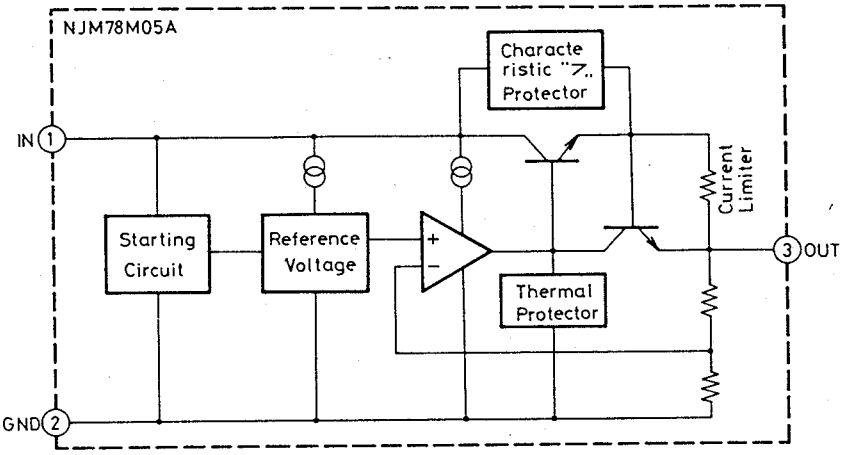
		3 <P43>	2 <P42>	1 <P41>	0 <P40>
0	<P30>	OPEN CLOSE	—	STOP CLEAR	PLAY PAUSE
1	<P31>	— —	— —	SKIP L	SKIP R
2	<P32>	— —	— —	MANUAL SERACH L	MANUAL SEARCH R
3	<P33>	— —	— —	PROGRAM	REPEAT

(6) Terminal Functions of μPD7514G (IC201)

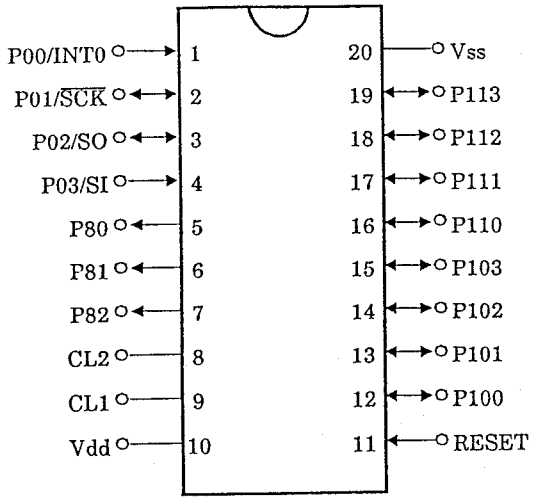
PIN No.	NAME	I/O	ACTIVE	Function
1	P41	I	H	KEY MATRIX INPUT 1
2	P40	I	H	0
3	X2	—	—	NO-USE [OPEN]
4	X1	—	—	[Vss or GND]
5	VLC3	—	—	LCD POWER SUPPLY
6	VLC2	—	—	
7	VLC1	—	—	
8	COM3	—	—	NO-USE [OPEN]
9	COM2	—	—	[OPEN]
10	COM1	O	H	COMMON OUT 1
11	COM0	O	H	2
12	S31	—	—	NO-USE [OPEN]
≀	≀	≀	≀	≀
19	S24	—	—	NO-USE [OPEN]
20	S23	O	H	SEGMENT OUT 23
≀	≀	≀	≀	≀
22	S21	O	H	SEGMENT OUT 21
23	NC	—	—	[OPEN]
24	S20	O	H	SEGMENT OUT 20
≀	≀	≀	≀	≀
32	S12	O	H	SEGMENT OUT 12
33	Vdd	—	—	POWER SUPPLY +5V
34	S11	O	H	SEGMENT OUT 11
≀	≀	≀	≀	≀
41	S4	O	H	SEGMENT OUT 4
42	NC	—	—	[OPEN]
43	S3	O	H	SEGMENT OUT 3
≀	≀	≀	≀	≀
46	S0	O	H	SEGMENT OUT 0
47	INT1	I	—	NO-USE [Vss]
48	RESET	—	H	RESET INPUT H-ACTIVE
49	CL1	—	—	C-R OSCILLTOR
50	CL2	—	—	
*51	*P73	*O	*H	*CD-ROM OUT
*52	*P72	*O	*H	*MODE OUT PLAY-SEARCH
*53	*P71	*O	*H	*MODE OUT STOP-SEARCH
54	P70	O	L	DISPLAY ACTIVE
55	P22	O	H	TLOF
56	P21	O	H	GU
57	P20	O	H	SVC CONNECT R/W
58	P13	I	H	WQ
59	P12	I	L	TEST2 CLOCK OUT (PULL UP)
60	P11	I	L	TEST1 TIME OUT OFF (PULL UP)
61	P10	I	H	DM-
62	P33	O	H	KEY MATRIX OUT 3
63	P32	O	H	2
64	Vss	—	—	GND
65	P31	O	H	KEY MATRIX OUT 1
66	P30	O	H	0
67	P03	I	H	SVC CONNECT D-OUT
68	P02	O	H	D-IN
69	P01	O	L	SCK
70	P00	—	—	NO-USE [Vss]
71	P63	O	H	LASER ON (H-Active)
72	P62	O	H	CLOSE OUT
73	P61	O	H	OPEN OUT
74	P60	O	L	DCS OUT (L-Active)
75	P53	I	H	REST SW
76	P52	I	H	OPEN SW
77	P51	I	H	CLOSE SW
78	P50	I	L	DCS INPUT (L-Active)
79	P43	I	H	KEY MATRIX IN 3
80	P42	I	H	2

Other LSI ICs and Internal Block Diagrams

IC101: NJM78M05A
(Voltage regulator)

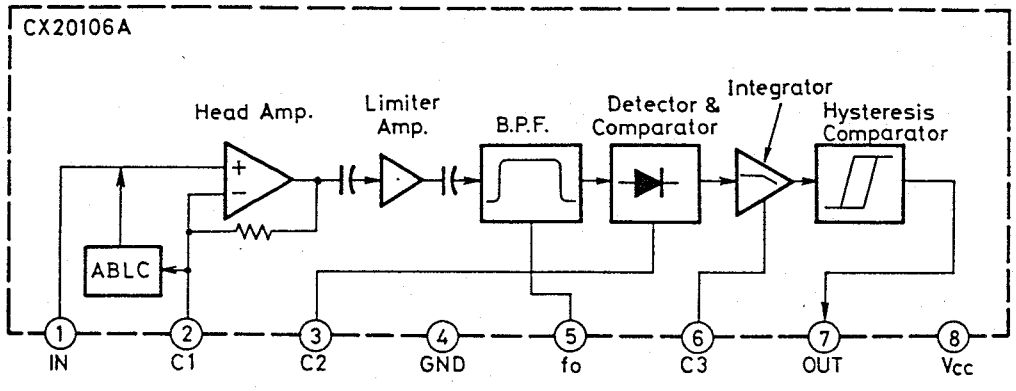


IC202 : μPD7564CS-42
(Remote Control Operation)

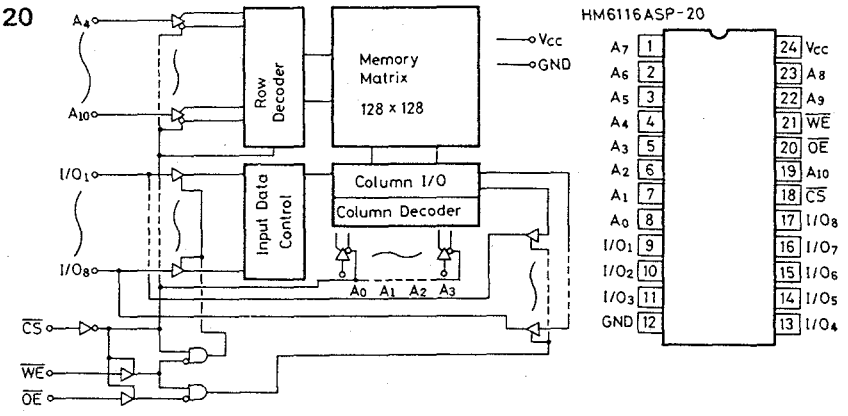


Pin	PORT	PORT to USE
1	P00	Timer PLAY USE. CHECK
2	P01	OPEN/CLOSE USE. CHECK
3	P02	RM. DATA=IN–PORT
4	P03	DCS. DATA=IN–PORT
5	P80	DCS. DATA=OUT–PORT
6	P81	RM. IND.=OUT–PORT
7	P82	OPEN/CLOSE OUT–PORT
8	CL2	Clock OUT–PORT
9	CL1	Clock IN–PORT
10	Vdd	5V±10%
11	RESET	RESET Circuit
12	P100	KEY=IN–0
13	P101	KEY=IN–1
14	P102	KEY=IN–2
15	P103	KEY=IN–3
16	P110	KEY=OUT–0
17	P111	KEY=OUT–1
18	P112	KEY=OUT–2
19	P113	KEY=OUT–3
20	Vss	GND

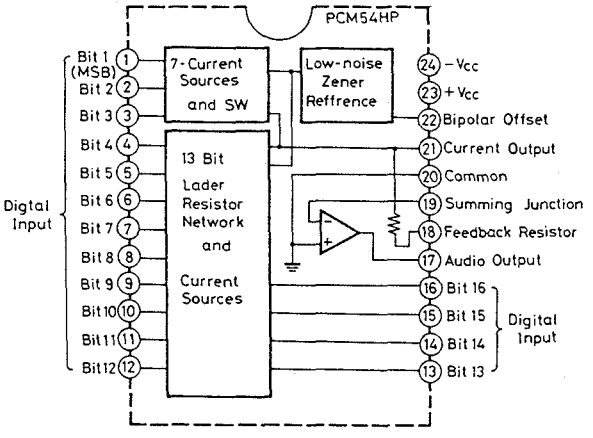
IC203 : CX20106A
(Remote Control Sensor)



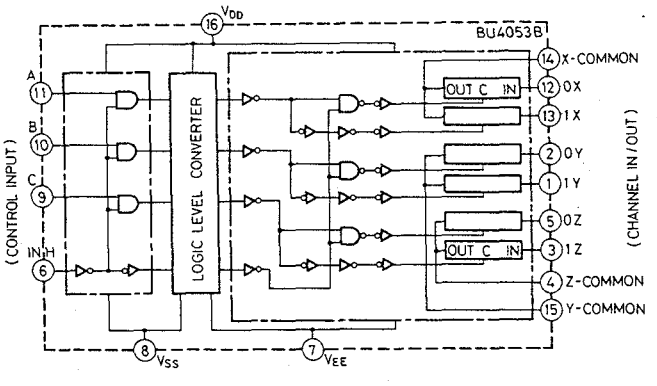
IC301: HM6116ASP-20
(Static RAM)



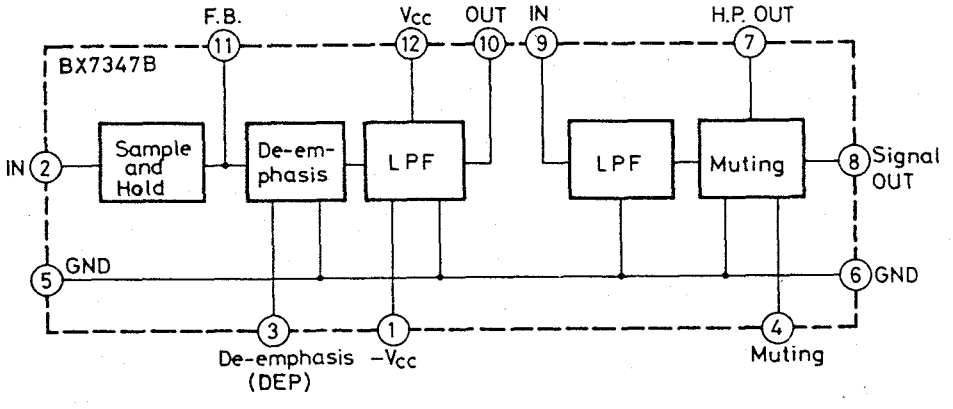
IC303: PCM54HP
(D/A converter)



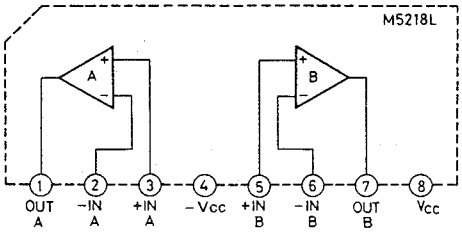
IC304: BU4053B
(Analog switch)
(Multiplexer)



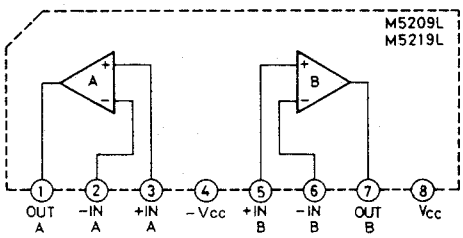
IC305, IC306: BX7347B
(Low-pass filter)



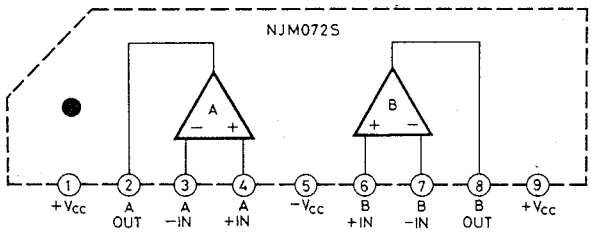
IC351: M5218L
(Dual op amp.)



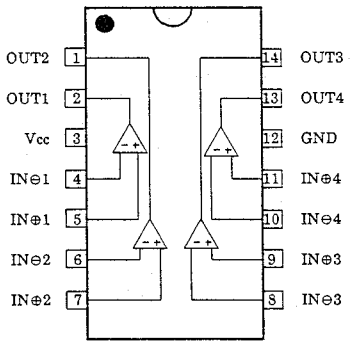
IC402: M5209L or M5219L
(Dual op amp.)



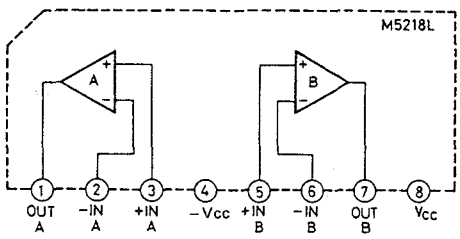
IC501: NJM072S
(Dual op amp.)



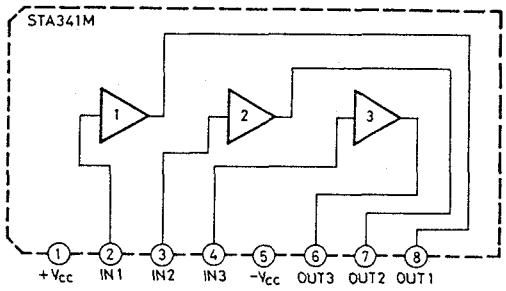
IC502: NJM2901N
(Quad comparator)



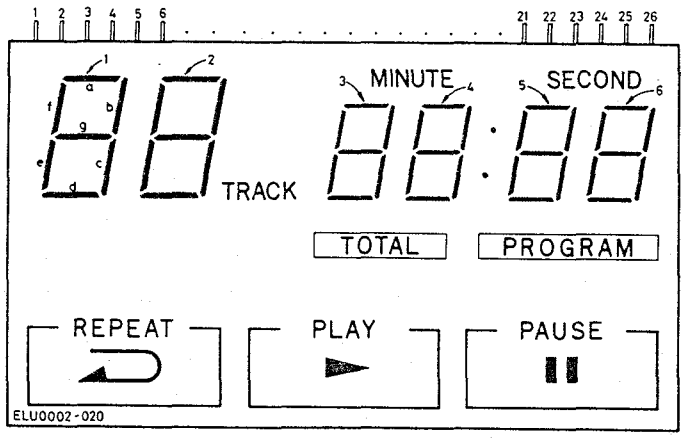
IC503, IC504, IC851: M5218L
(Dual op amp.)



IC801: STA341M
(Power op amp.)
(Driver array)



LC201: ELU0002-020
(Liquid crystal display)



Pin No.	1	2	3	4	5	6	7	8	9	10	11	12	13
COM0	1a	1f	1d	1e	2a	2f	2d	2e	3a	3f	3d	3e	4a
COM1	TOTAL	1b	1c	1g	▶	2b	2c	2g	▮▮	3b	3c	3g	PROG.

Pin No.	14	15	16	17	18	19	20	21	22	23	24	25	26
COM0	4f	4d	4e	5a	5f	5d	5e	6a	6f	6d	6b	COM0	—
COM1	4b	4c	4g	Constant light-on	5b	5c	5g	⮌	6b	6c	6g	—	COM1

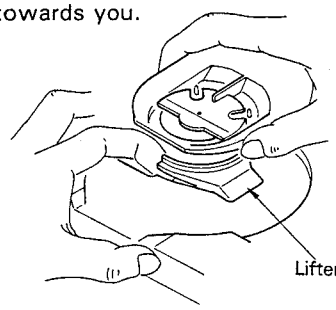
Disassembly Procedures

(1) Metal cover removal

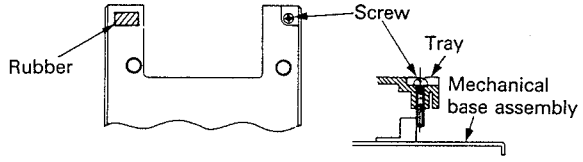
1. Remove the 5 screws.
2. Remove the cover top by lifting it and pulling it diagonally rearwards.
3. If difficult to remove, lift the front portion of the metal cover from the rear and the cover can easily be removed.

(2) Tray assembly removal

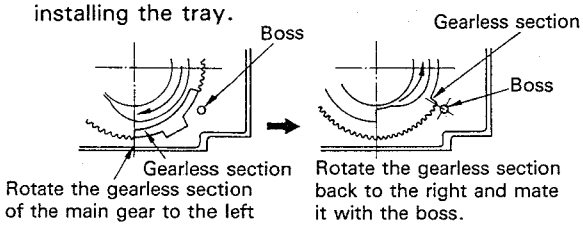
1. Remove the metal cover.
2. Turn on the power, press the Open/Close switch and pull out the tray. Then turn off the power.
   * If the power cannot be turned on due to a breakdown, raise the lifter with your fingers and pull the tray towards you.



3. Remove the tray stopper screw and remove the tray by pulling it towards you. (Remove the rubber.)

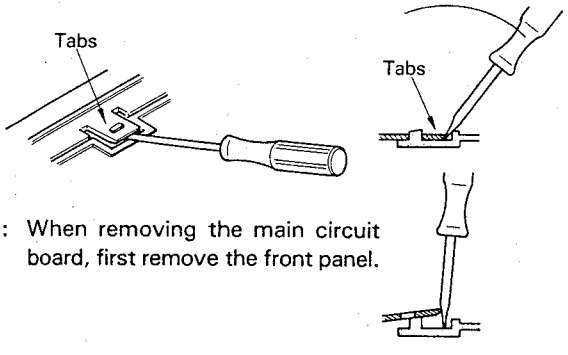


4. Rotate the gearless section of the main gear to the left, then rotate it back to the right and mate it with the boss of the mechabase (visual inspection) before installing the tray.


Boss
Gearless section
Boss
Gearless section
Rotate the gearless section of the main gear to the left
Rotate the gearless section back to the right and mate it with the boss.

(3) Front panel assembly removal

1. Remove the tray assembly.
2. Remove the 3 screws.
3. Remove the 3 tabs at the bottom. Raise the tabs with a straight-bladed screwdriver and pull the front panel towards you. Be sure not to damage the chassis.



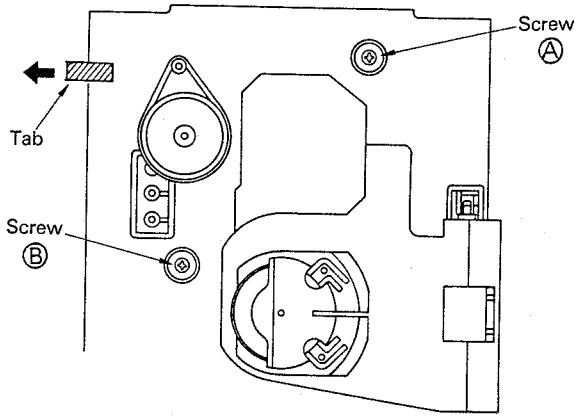
Note: When removing the main circuit board, first remove the front panel.

(4) LCD printed circuit board removal

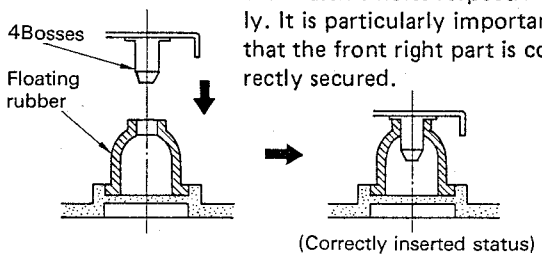
1. Remove the 2 plastic rivets.
2. Remove the circuit board by sliding it rearwards.
3. Do not soil the LCD surface by touching it. → See "LCD Precautions" page 1-17.

(5) Mechanical assembly removal

1. Remove the tray assembly.
2. Remove the 2 screws.

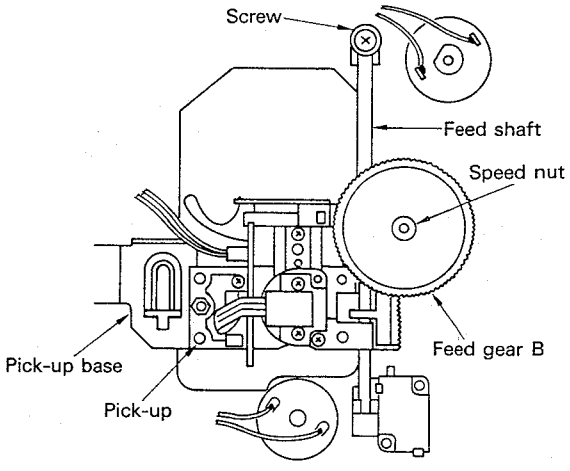


3. After removing the tab on the left side of the chassis, remove the assembly by lifting it straight up and sliding it slightly rearwards.
4. Make sure that the 4 bosses at the rear of the mechanical assembly are correctly positioned in the floating rubber of the chassis when the assembly is reinstalled. As a confirmative method, check up that the bosses of screws Ⓐ and Ⓑ are positioned in the center of the chassis's holes respectivve-ly. It is particularly important that the front right part is correctly secured.



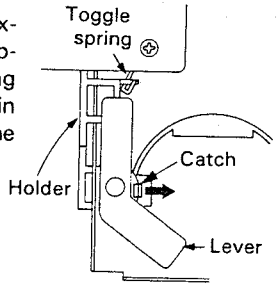
(6) Laser pick-up removal

1. Remove the speed nut and remove feed gear B.
2. Remove the feed shaft lock screw and remove the feed shaft with the pick-up.
3. Remove the pick-up from the pick-up base.

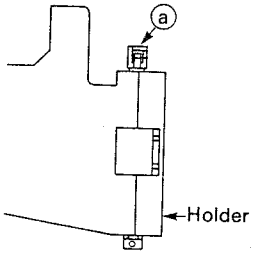


(7) Spindle motor removal

1. First demount the tray assembly.
2. Detach the lever.
   The lever can be extracted by pulling it upward while pushing the catch (shown in the figure below) in the arrow direction.

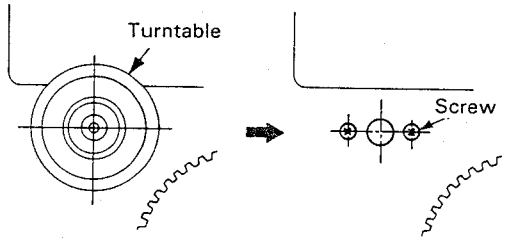


3. Detach the holder from point (a)



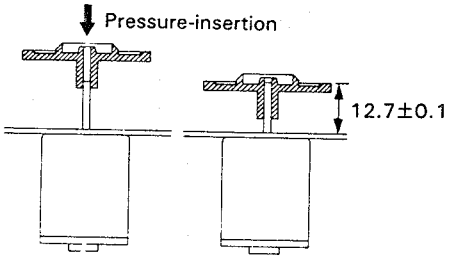
Note: After the holder has been reinstalled, correctly replace the toggle spring (shown in the figure under (7)-2.)

4. Extract the turntable and remove the two screws.

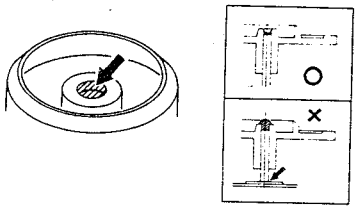


Note: Installation of spindle motor

1. Replace the two screws by applying uniform tightening torque.
2. Pressure-insert the turntable. Straight insertion must be made while supporting the motor at its lowest section, and accurate alignment must be achieved to obtain its height of 12.7 mm ±0.1 mm from the mechanical base top surface.



3. After pressure-insertion is made, bond the motor shaft and turntable together (arrow-mark section on the left-hand figure below). Use the bonding agent of "LOCTITE #460" while limiting the applied volume to a minimum. Exercise care not to cause surplus bonding agent to pile up on the turntable, as shown in the lower-side figure. Absolutely avoid causing the bonding agent to attach to the motor bearings (arrow-mark section on the right-hand figure above.).

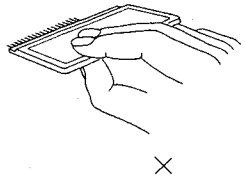


LCD Panel Handling Precautions

The LCD (Liquid Crystal Display) panel employed in this device requires the following handling precautions.

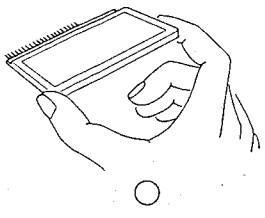
1. Since the LCD is made of plate glass, never apply strong mechanical force to it.

   Do not forcibly press the light-polarizing plate.



×

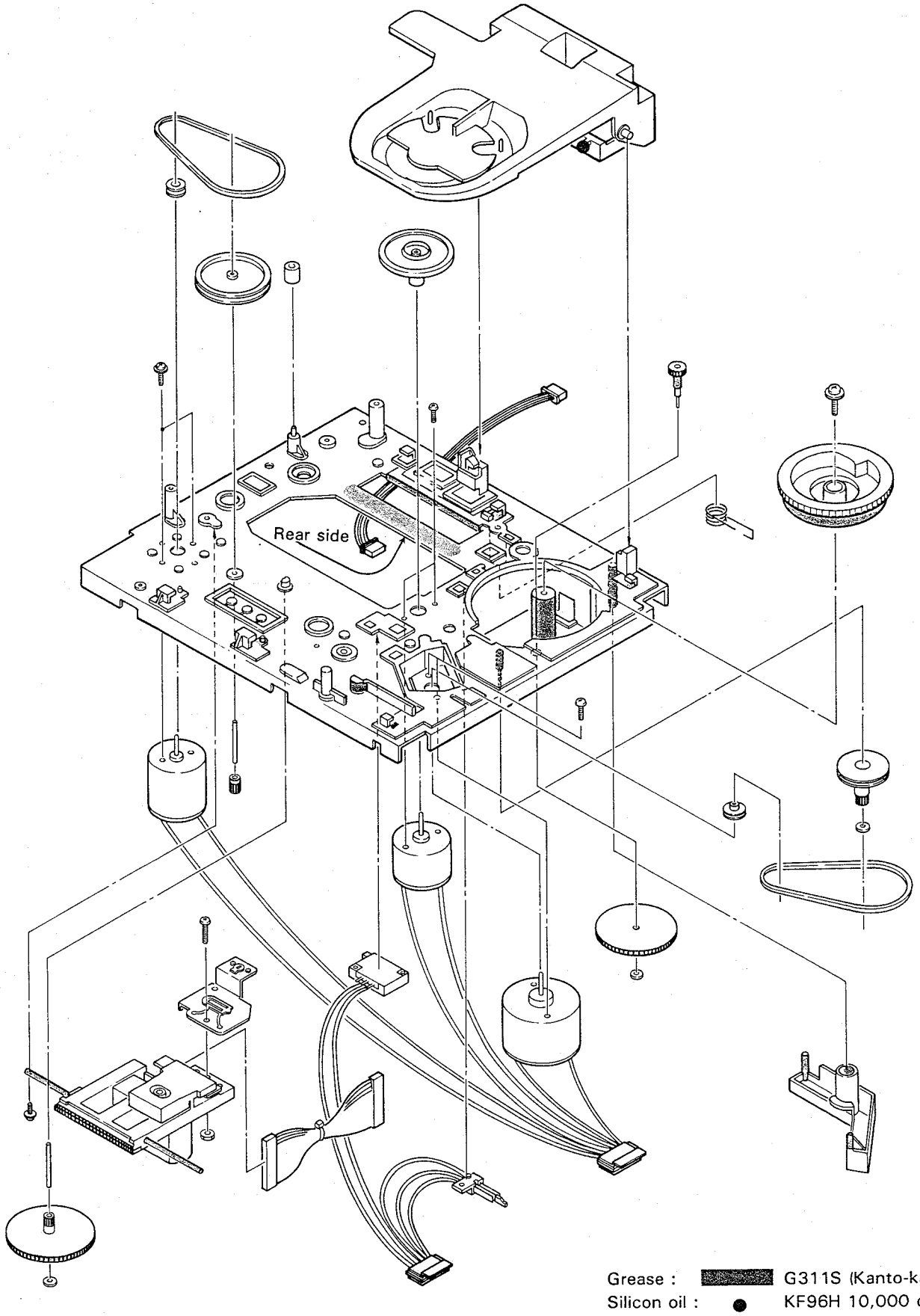
When handling, grip it as shown in the figure below.



○

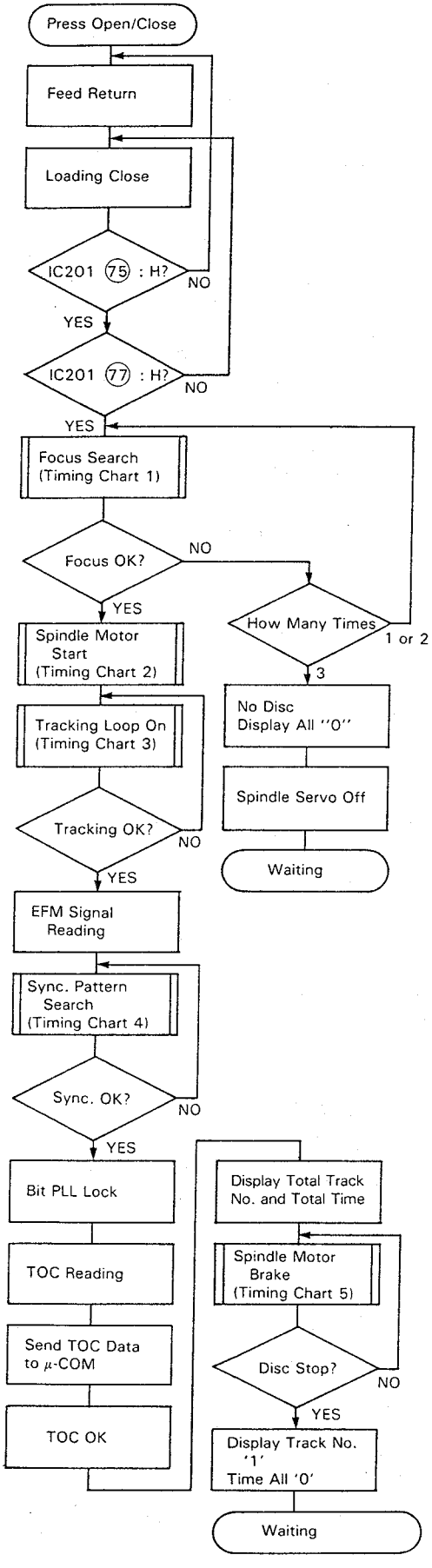
2. When handling the LCD, wear gloves whenever possible.
3. When the light-polariziang plate (surface other than silk-printed areas) becomes contaminated, use an applicator moistened with isoproply alcohol to gently wipe it clean. As for the silk-printed areas, use a soft cloth to gently wipe it clean.
   Note: The light-polarizing plate attached to the LCD surface and the silk-printed areas are made of soft material.
4. As much as possible, avoid exposing the LCD to harmful light irradiation (direct sunlight or ultraviolet rays), especially when the device is not in use.
5. Do not imprint DC voltage on pins of the LCD (its characteristics will be degraded).
6. When the LCD is damaged, resulting in leakage of liquid crystal, be very cautions to keep the liquid away from one's mouth or swallowing it. Should liquid crystal contact the hands or clothing, immediately wash with water, using soap or other appropriate cleanser.

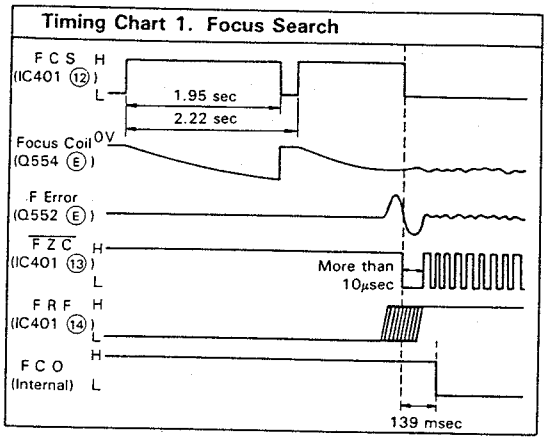
Application Points for Grease

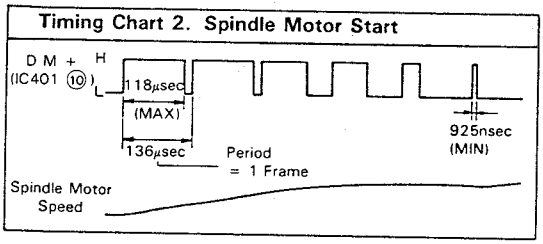


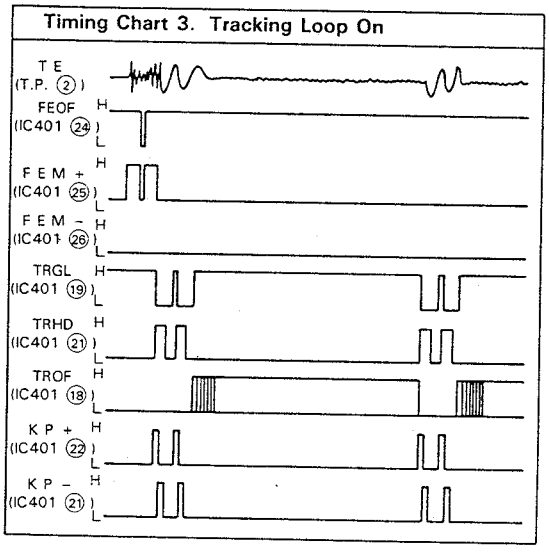
Grease : G311S (Kanto-kasei)
Silicon oil : KF96H 10,000 cs (Shin-etsu-kagaku)

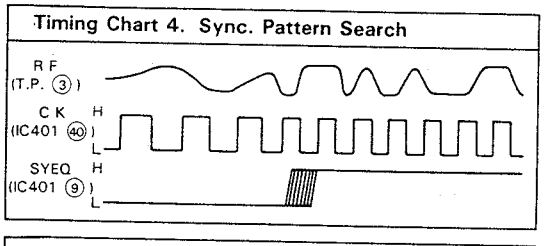
Timing Chart for TOC Reading

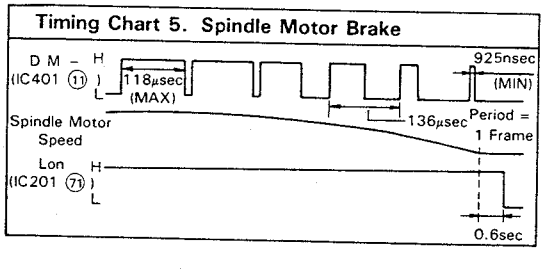












Maintenance of Laser Pickup

(1) Service life of the laser pickup

1) Turn the power on after connecting FW102 pin ④ on the front PCB (ENN-045) to +5 V point.
2) Measure the laser power with the laser power meter.
3) Measure the EFM output if a laser power meter is not available.
4) When the measured value is as shown in the table below, replace the pickup because the service life of the laser diode is judged as having expired.

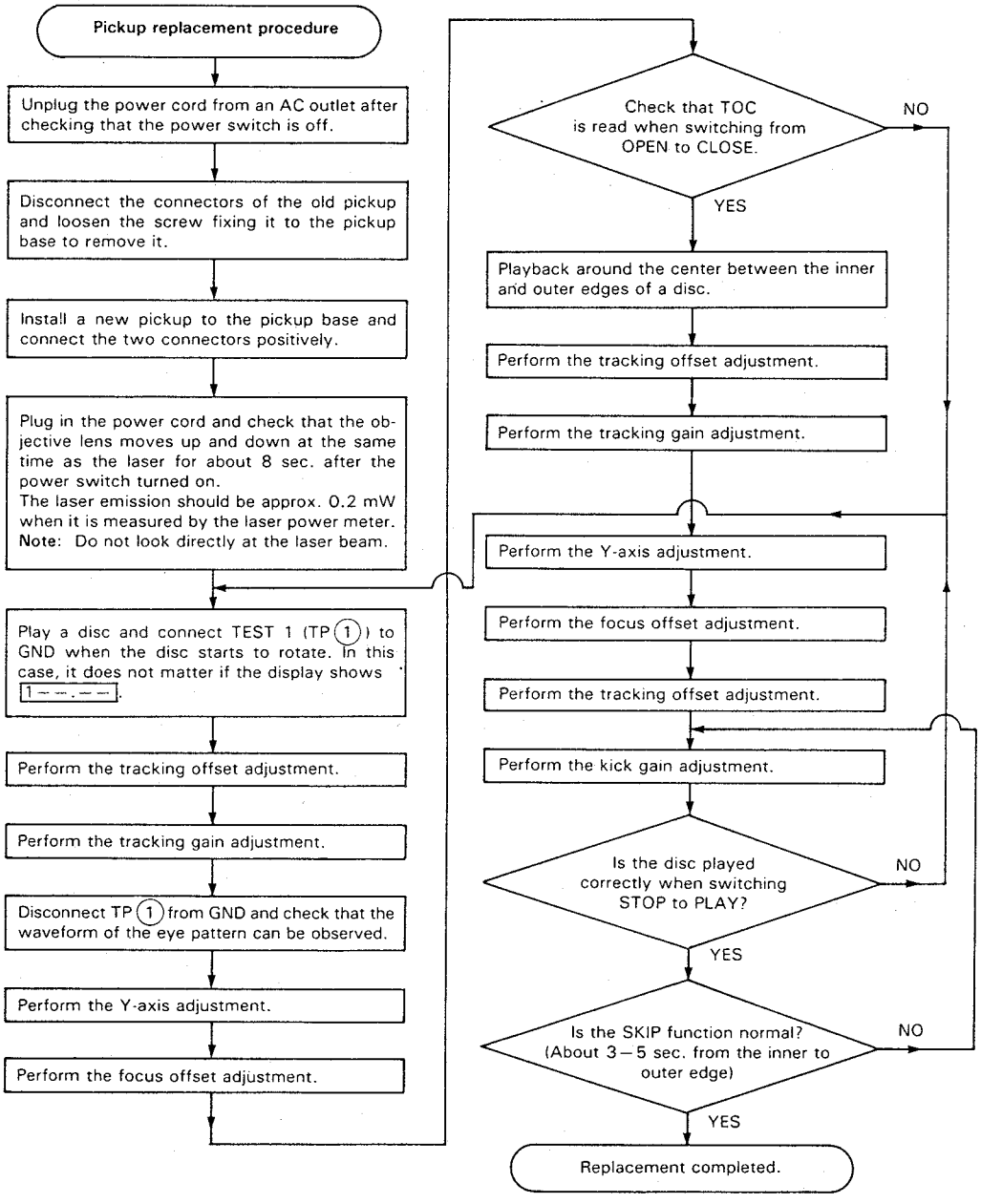
Measurement value	Measurement instrument	Measured value
Laser power	Laser power meter	Less than 0.1 mW
EFM output (Amplitude of eye pattern)	Oscilloscope	Less than 1.7 V

(2) Semifixed resistor on the APC board

The semifixed resistor on the APC board installed with the pickup is for the laser power adjustment. Do not touch the semifixed resistor because this adjustment should be performed as part of a pair of adjustments to match the characteristics of the optical block.
If the laser power is too low, replace the pickup because the service life of the laser diode has expired.
Turning the semifixed resistor for a normal pickup may damage the pickup because of overcurrent.

(3) Grating adjustment

Since all parts have been carefully adjusted before assembly, a grating adjustment is not required.
As parts become unadjusted, the laser beam/s will start to mistrack and sound reproduction may become impossible.


Pickup replacement procedure
Unplug the power cord from an AC outlet after checking that the power switch is off.
Disconnect the connectors of the old pickup and loosen the screw fixing it to the pickup base to remove it.
Install a new pickup to the pickup base and connect the two connectors positively.
Plug in the power cord and check that the objective lens moves up and down at the same time as the laser for about 8 sec. after the power switch turned on.
The laser emission should be approx. 0.2 mW when it is measured by the laser power meter.
Note: Do not look directly at the laser beam.
Play a disc and connect TEST 1 (TP ①) to GND when the disc starts to rotate. In this case, it does not matter if the display shows 1--.--.
Perform the tracking offset adjustment.
Perform the tracking gain adjustment.
Disconnect TP ① from GND and check that the waveform of the eye pattern can be observed.
Perform the Y-axis adjustment.
Perform the focus offset adjustment.
Check that TOC is read when switching from OPEN to CLOSE.
NO
YES
Playback around the center between the inner and outer edges of a disc.
Perform the tracking offset adjustment.
Perform the tracking gain adjustment.
Perform the Y-axis adjustment.
Perform the focus offset adjustment.
Perform the tracking offset adjustment.
Perform the kick gain adjustment.
Is the disc played correctly when switching STOP to PLAY?
NO
YES
Is the SKIP function normal? (About 3–5 sec. from the inner to outer edge)
NO
YES
Replacement completed.

Adjustment Procedures

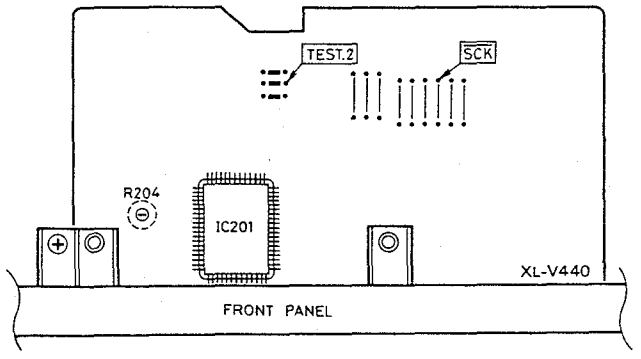
(1) PLL freerun adjustment

1) Adjustment instrument
   Frequency counter
2) Adjustment procedure
   1. Remove the tray assembly and the front panel assembly. (Refer to item (2) and (3) on page 1-16.)
   2. Connect the frequency counter between ENN-044 IC401 Pin (40) and GND.
   3. Short the TP3 (RF) and GND (TP4).
   4. Adjust the L401 to 4.322±0.001 MHz indicated on the frequency counter with the regulating rod.
   5. Perform this checking no sooner than switching on the power.

(2) Clock frequency adjustment

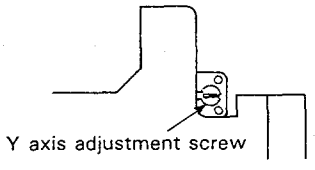
1) Adjustment instruments
   Frequency counter
2) Adjusting procedure
   Adjust the clock frequency after replacing the IC201 as follows:
   1. Remove the tray assembly and the front panel assembly. (Refer to item (2) and (3) on page 1-16.)
   2. Connect the TEST 2 point of ENN-045-1 to ground.
   3. Connect the frequency counter between $\overline{SCK}$ and ground.
   4. Set the power switch to on.
   5. Rotate R204 until the counter frequency display shows a reading of 200 kHz ±4 kHz.
   6. Ser the power switch to off.
   7. Disconnect Test 2 from ground (terminal).

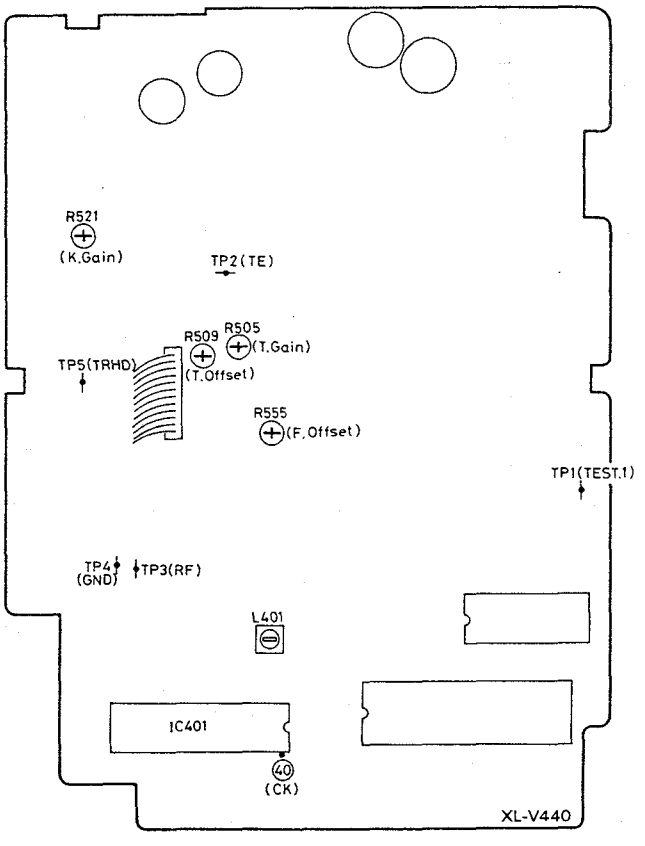
Note: When connectint to the TEST 2 point, use the resistance lead on the parts side.



(3) Y Axis adjustment

1) Adjustment instrument
   Oscilloscope, Straight-bladed screwdriver, Normal disc
2) Adjustment procedure
   1. Remove the tray assembly and the front panel assembly. (Refer to item (2) and (3) on page 1-16.)
   2. Connect the oscilloscope between EEN-044 TP3 (RF) and GND (TP4).
   3. Play the disc.
   4. Drive the Y axis adjustment screw over the pickup base, and find the point where the RF signal (waveform on the oscilloscope) becomes maximum amplitude and the finest waveform.
   5. This adjustment performs inner area of the disc.
   6. Advance the pickup to the outer track and make sure that the amplitude doesn't come down 2/3 below of inner track.



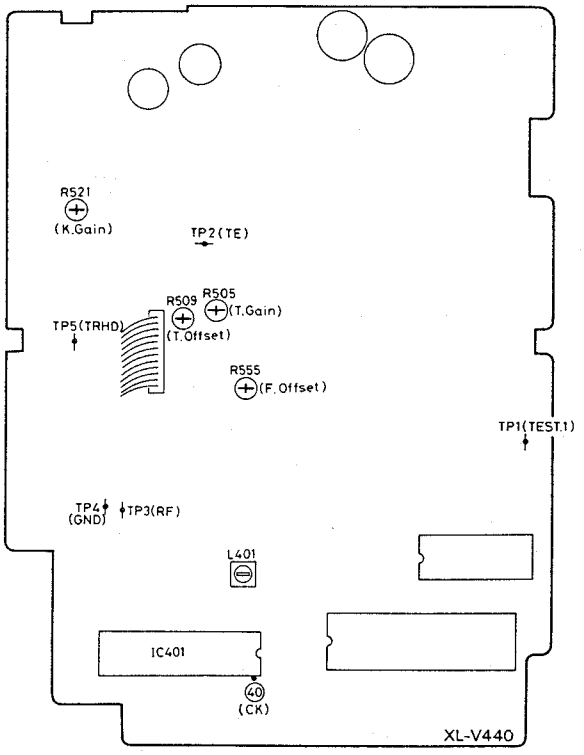


(4) Focusing offset adjustment

1) Adjustment instrument
   Oscilloscope, Normal disc
2) Adjustment procedure
   1. Connect the oscilloscope between ENN-044 TP3 (RF) and GND.
   2. Play the disc.
   3. Adjust the R555 as the RF signal (waveform on the oscilloscope) becomes maximum amplitude and the finest waveform.

(5) Tracking gain adjustment

1) Adjustment instrument
   Oscilloscope, Normal disc
2) Adjustment procedure
   1.Connect the oscilloscope between ENN-044 TP2 (TE) and GND.
   2. Play the disc.
   3. Short the TP1 (TEST. 1) to GND.
   4. Adjust the R505 as the tracking error signal (waveform on the oscilloscope) becomes 2 Vp-p.



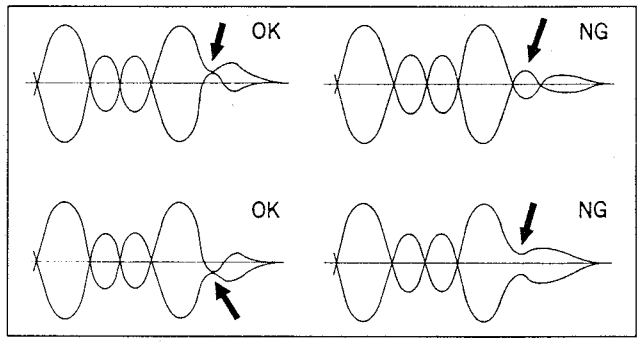
(6) Tracking offset adjustment

1) Adjustment instrument
   Oscilloscope, Normal disc.
2) Adjustment procedure
   1. Connect the oscilloscope between ENN-044 TP2 (TE) and GND.
   2. Play the disc.
   3. Short the TP1 (TEST. 1) to GND.
   4. Adjust the R509 as making the tracking error signal (waveform on the oscilloscope) that the DC level is 0.

Note: Adjust R509 so that the waveform upper and lower points become symmetrical with the 0 level.

(7) Kick gain adjustment

1) Adjustment instrument
   Oscilloscope (2ch), Normal disc.
2) Adjustment procedure
   1. Connect the ch1 of oscilloscope between ENN-044 TP2 (TE) and GND, the ch2 of oscilloscope between TP5 (TRHD) and GND.
   2. Turn the oscilloscope Normal mode with triggered by the ch2.
   3. Play the disc.
   4. Play back the last number recorded on a disk and press the PAUSE button in mid course. At this time, observing an oscilloscope adjust VR521 to obtain the correct waveform as shown in the figure below.

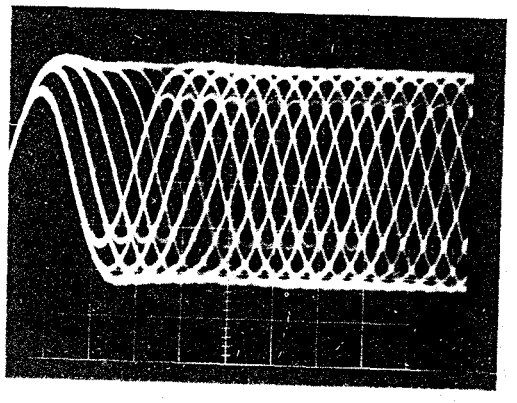


0.2 ms/div. 0.5 V/div.

Note: (1) Adjust VR521 so that the fifth peaks (pointed out by the arrow mark in the figure) are tangent each other. If they are crossing or separating each other, continue the adjustment to obtain the best result.
(2) Observe the waveform by using channel 1 of the oscilloscope. At that time, also connect channel 2 of the oscilloscope.

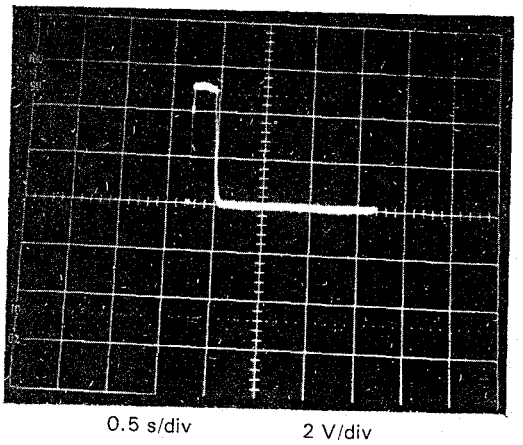
Important Waveforms

1. Eye pattern (RF signal)
TP3 (RF); standard eye pattern.



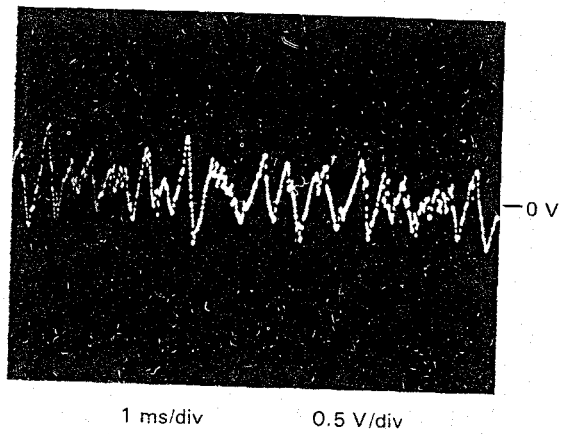
0.5 μs/div 0.5 V/div

2. Reset signal of microcomputer
Q204 collector



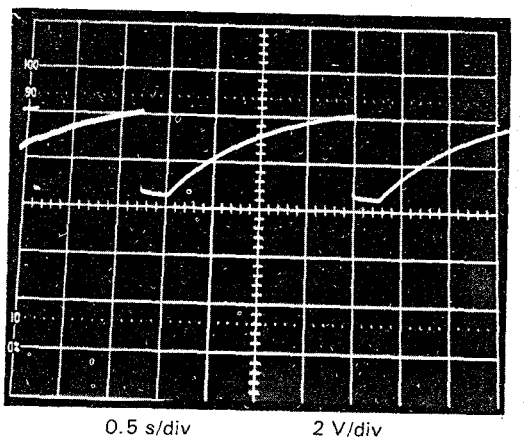
0.5 s/div 2 V/div

3. Focus signal during play
Q554 emitter; operates with period of about 0.2—1 ms.



1 ms/div 0.5 V/div

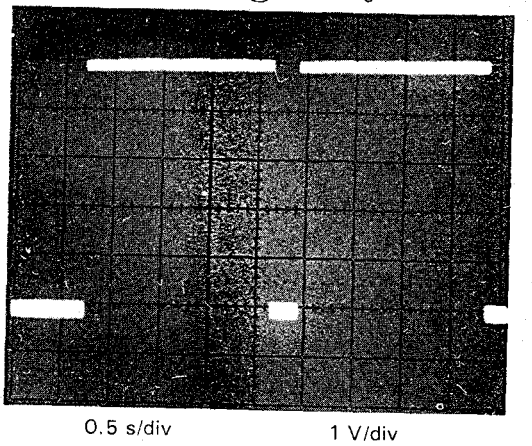
4. Focus search voltage
Voltage across C555; the waveform lens is moved up and down by this voltage when the platter is loaded without a disc.



0.5 s/div 2 V/div

5. Pulse for focus search voltage
Pulse for focus search transmitted from IC401

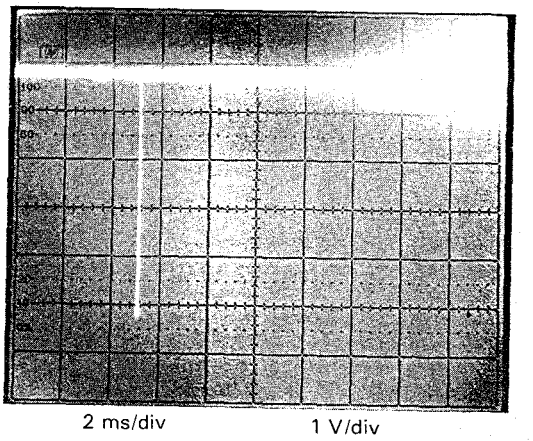
IC401 Pin (12) FCS signal



0.5 s/div 1 V/div

6. Focus zero-cross output
Pulse showing that focus output waveform has almost passed the zero point.

IC502 Pin (1) output

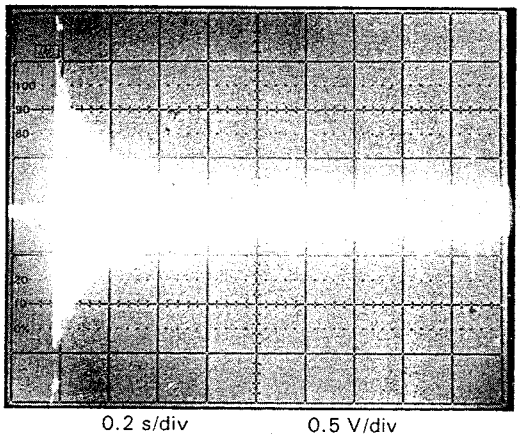


2 ms/div 1 V/div

7. Focus drive waveform

Waveform until focus is obtained, spindle motor starts to rotate and TOC is read.

Q554 emitter; when focus has been finished and motor starts to rotate

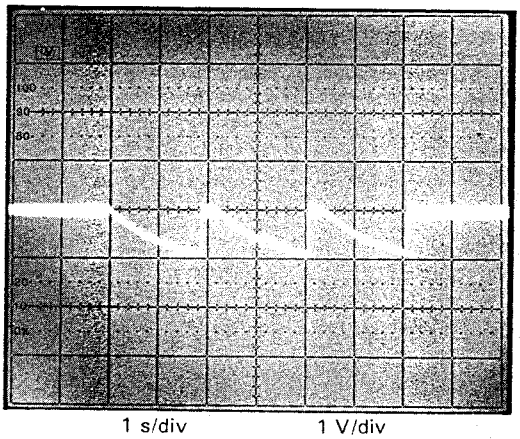


0.2 s/div 0.5 V/div

8. Drive waveform during focus search

Drive waveform of focus coil when the platter is loaded without a disc.

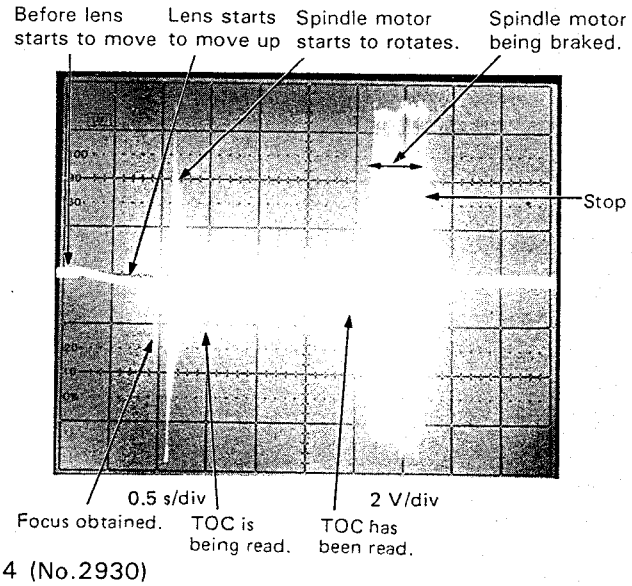
Q544 emitter; focus signal when no disc is loaded



1 s/div 1 V/div

9.Waveform until TOC is read

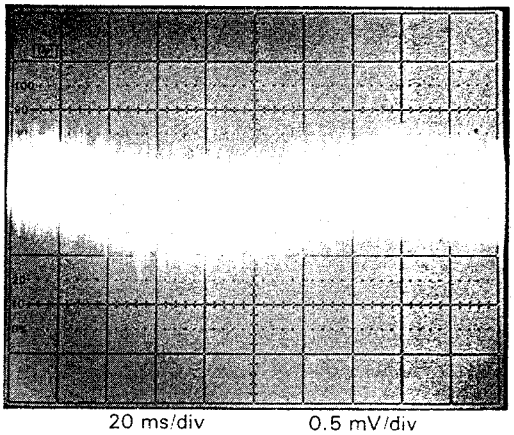
Q554 emitter; until TOC has been read and spindle motor stops



10. Tracking waveform during normal play

Q501 emitter

Wavevform during play

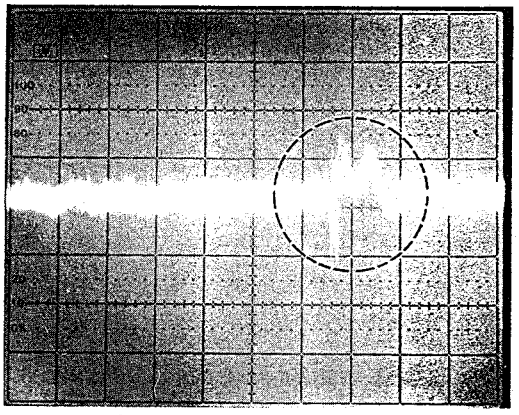


20 ms/div 0.5 mV/div

11. TP2 (TE) waveform of high speed search in forward direction

Output when track is jumped is visible

TP2 (TE); in case of transporting in high speed search ►►

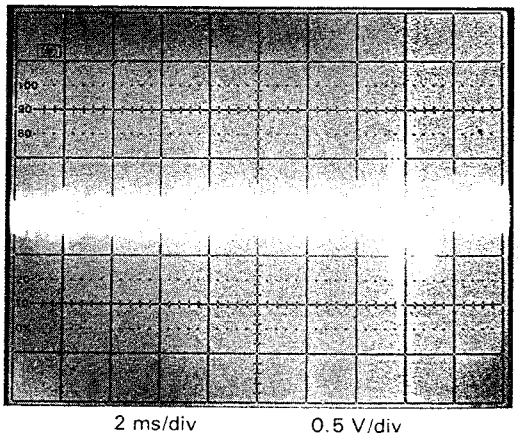


2 ms/div 0.5 V/div

12. TP2 (TE) waveform of high speed search in backward direction

The waveform the reverse of that in high speed search in forward direction is shown.

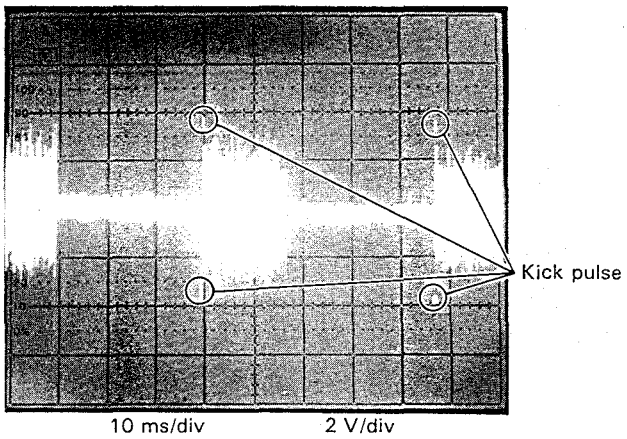
TP2 (TE); in case of returning by high speed search ◄◄



2 ms/div 0.5 V/div

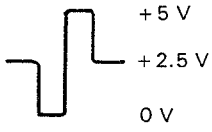
13. Drive waveform during high speed search
Output such as noise is output when track is crossed.

Q501 emitter; during high speed search

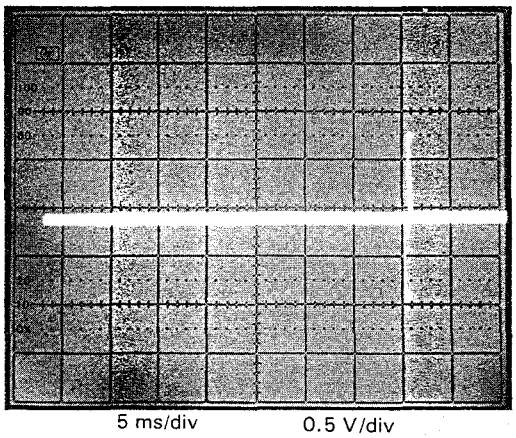


10 ms/div 2 V/div

14. Kick pulse when searching
When advancing the track, waveform below is output.



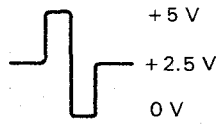
Q501 emitter; Kick pulse when ▶▶ is used.



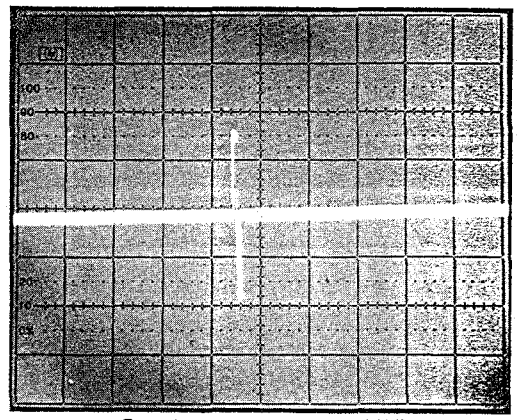
5 ms/div 0.5 V/div

Note: Insert the LPF shown below between the test point and the mesuring equipment.

15. Kick pulse when searching
When returning the track, waveform below is output.

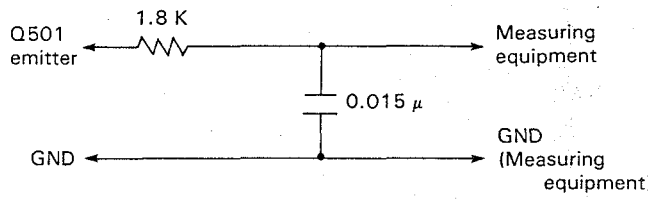


Q501 emitter; Kick pulse when ◀◀ is used.



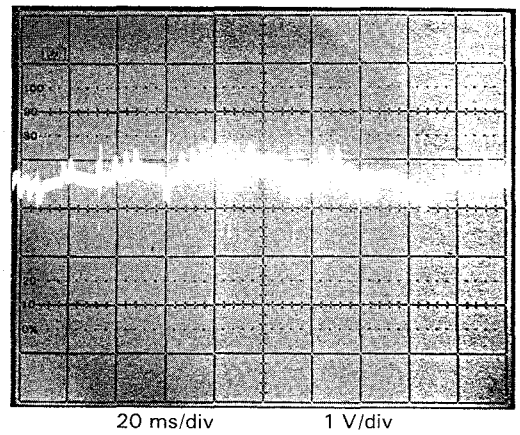
5 ms/div 0.5 V/div

LPF circuit



16. Spindle motor drive waveform during play

IC801 Pin ⑧

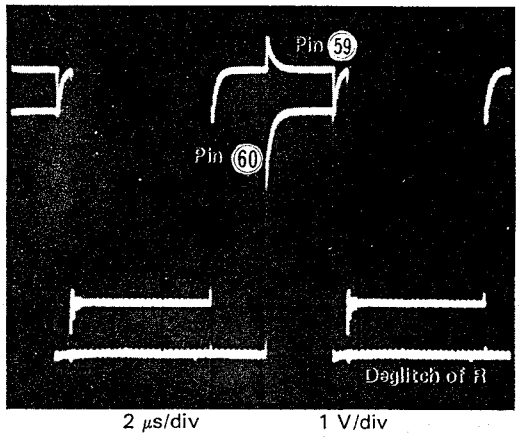


20 ms/div 1 V/div

17. L/R switching signal and deglitch signal of R

R deglitch signal (Pin (60)) is input when switching signal (Pin (59)) is at "H" level.

Waveforms of IC302 Pins (59) and (60)

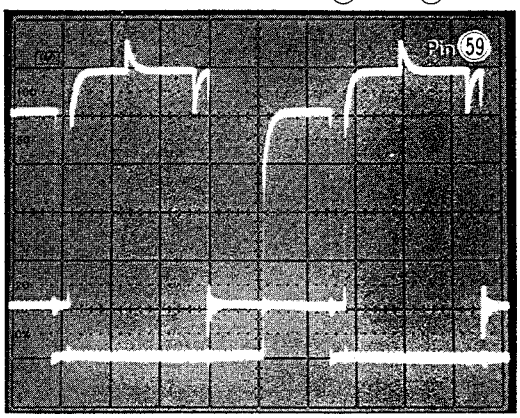


2 μs/div 1 V/div

18. L/R switching signal and deglitch signal of L

L deglitch signal (Pin (61)) is input when switching signal (Pin (59)) is at "L" level.

Waveform of IC302 Pins (59) and (61)



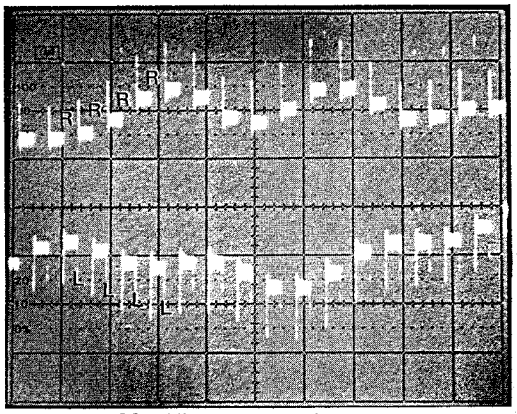
2 μs/div 1 V/div

Note: Photos (17) and (18) are shifted by 1 V for better visibility.

19. AF signal switched after D/A

Waveform showing that R and L are output alternately.

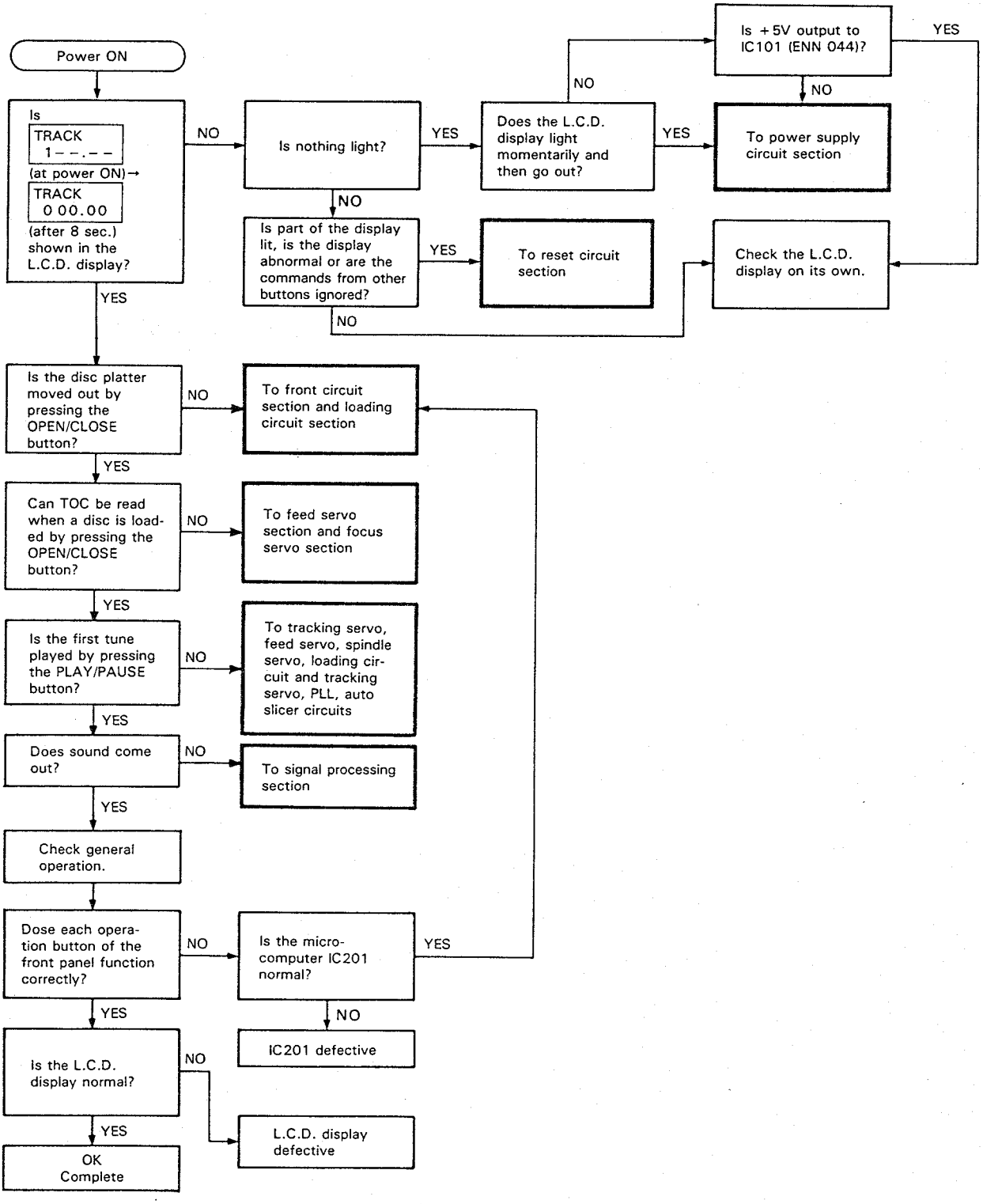
R/L signal switched of IC303 Pins (19) and (20)



20μs/div 0.5 V/div

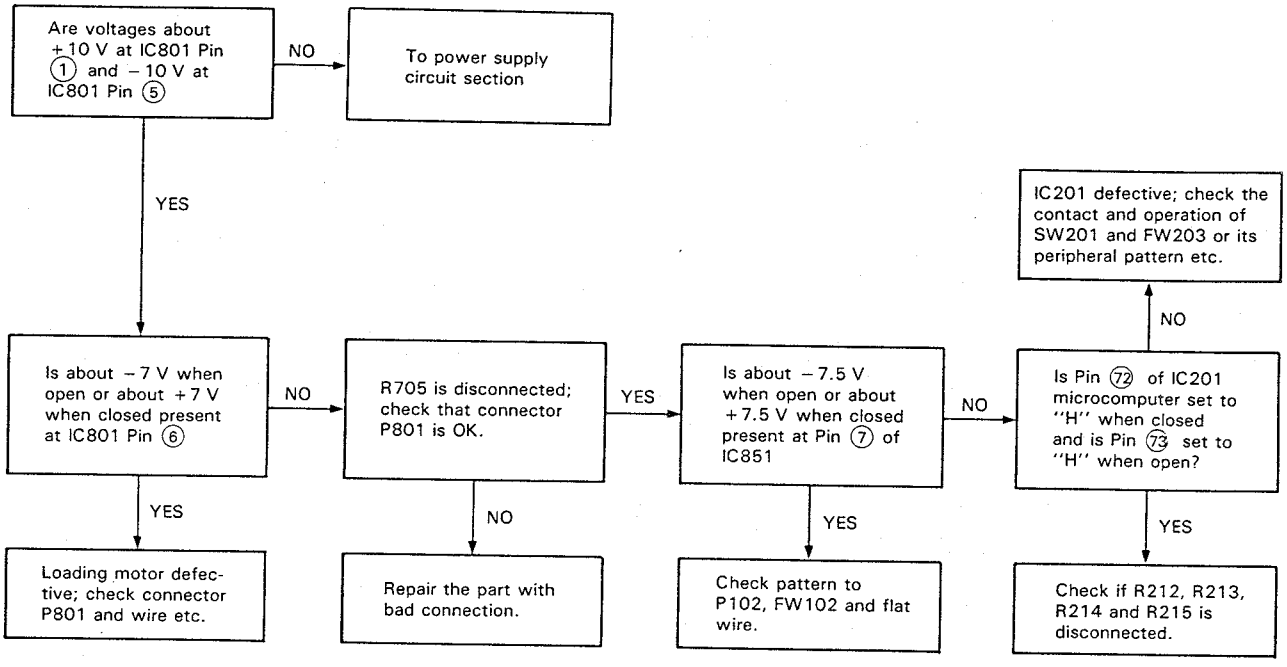
Troubleshooting

Shows the condition of each circuit from when the power is switched on to when play can be started.

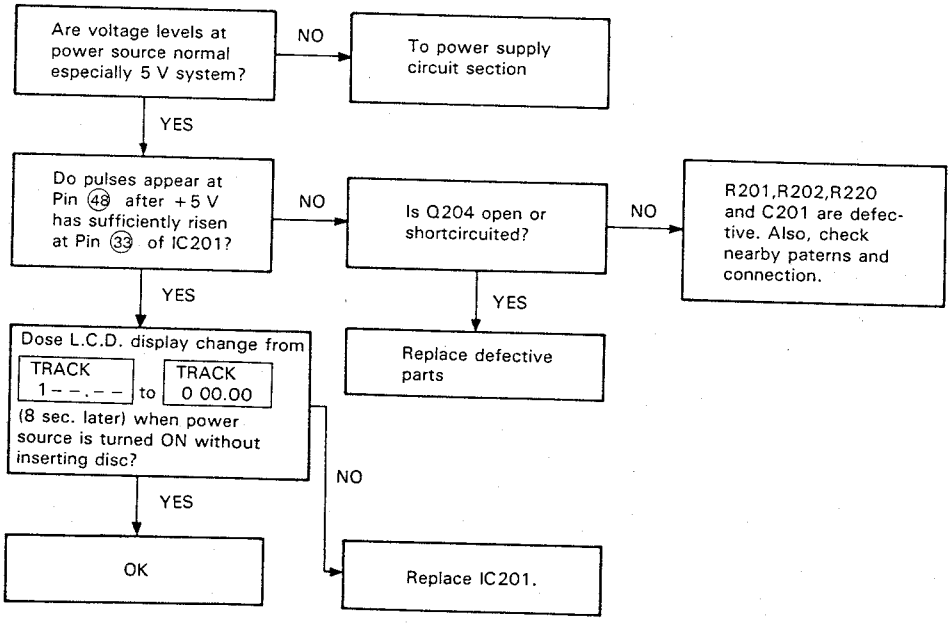

Power ON
Is TRACK 1--.-- (at power ON)→ TRACK 0 00.00 (after 8 sec.) shown in the L.C.D. display?
NO
Is nothing light?
YES
Does the L.C.D. display light momentarily and then go out?
YES
Is +5V output to IC101 (ENN 044)?
YES
NO
NO
To power supply circuit section
NO
Is part of the display lit, is the display abnormal or are the commands from other buttons ignored?
YES
To reset circuit section
Check the L.C.D. display on its own.
NO
YES
Is the disc platter moved out by pressing the OPEN/CLOSE button?
NO
To front circuit section and loading circuit section
YES
Can TOC be read when a disc is loaded by pressing the OPEN/CLOSE button?
NO
To feed servo section and focus servo section
YES
Is the first tune played by pressing the PLAY/PAUSE button?
NO
To tracking servo, feed servo, spindle servo, loading circuit and tracking servo, PLL, auto slicer circuits
YES
Does sound come out?
NO
To signal processing section
YES
Check general operation.
Dose each operation button of the front panel function correctly?
NO
Is the microcomputer IC201 normal?
YES
NO
IC201 defective
YES
Is the L.C.D. display normal?
NO
L.C.D. display defective
YES
OK
Complete

Loading Circuit

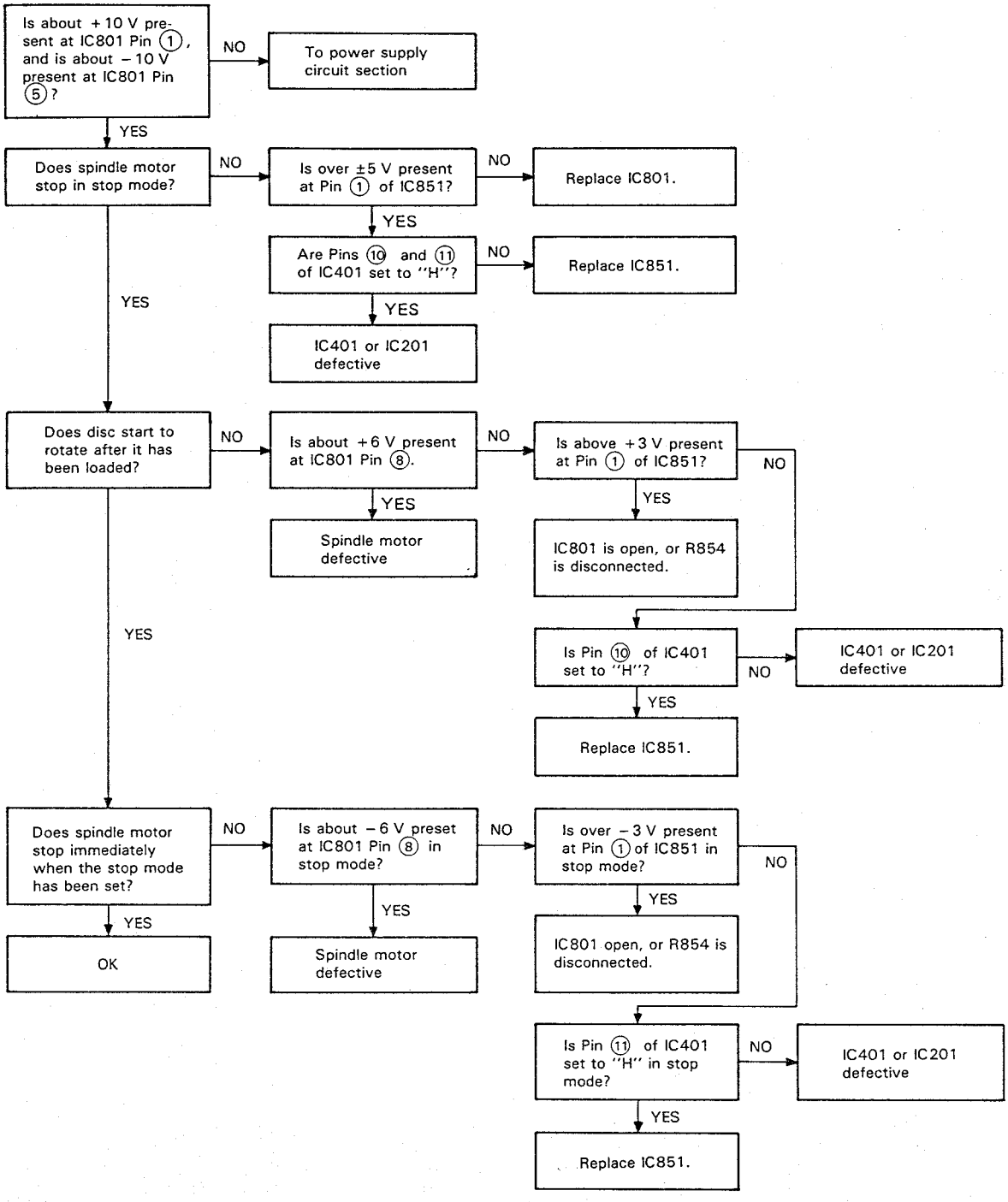
(Perform these steps when the drawer does not move even when the OPEN/CLOSE button on the front panel is pressed.)


Are voltages about +10 V at IC801 Pin (1) and −10 V at IC801 Pin (5)
NO
To power supply circuit section
YES
Is about −7 V when open or about +7 V when closed present at IC801 Pin (6)
NO
R705 is disconnected; check that connector P801 is OK.
YES
Is about −7.5 V when open or about +7.5 V when closed present at Pin (7) of IC851
NO
Is Pin (72) of IC201 microcomputer set to "H" when closed and is Pin (73) set to "H" when open?
NO
IC201 defective; check the contact and operation of SW201 and FW203 or its peripheral pattern etc.
YES
Loading motor defective; check connector P801 and wire etc.
NO
Repair the part with bad connection.
YES
Check pattern to P102, FW102 and flat wire.
YES
Check if R212, R213, R214 and R215 is disconnected.

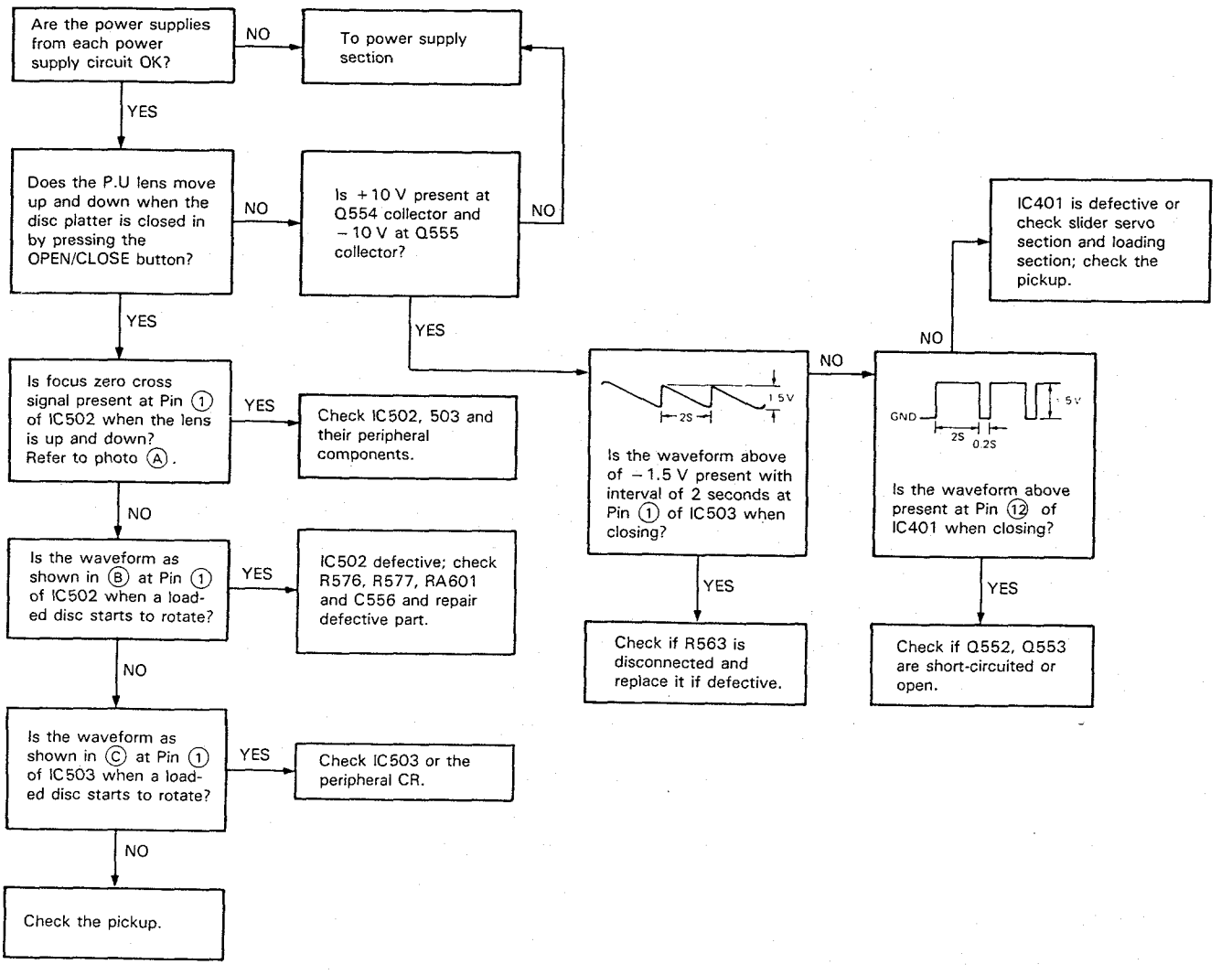
Reset Circuit Section


Are voltage levels at power source normal especially 5 V system?
NO
To power supply circuit section
YES
Do pulses appear at Pin (48) after +5 V has sufficiently risen at Pin (33) of IC201?
NO
Is Q204 open or shortcircuited?
NO
R201,R202,R220 and C201 are defective. Also, check nearby paterns and connection.
YES
Replace defective parts
YES
Dose L.C.D. display change from TRACK 1−−.−− to TRACK 0 00.00 (8 sec. later) when power source is turned ON without inserting disc?
NO
YES
OK
Replace IC201.

Spindle Servo Section

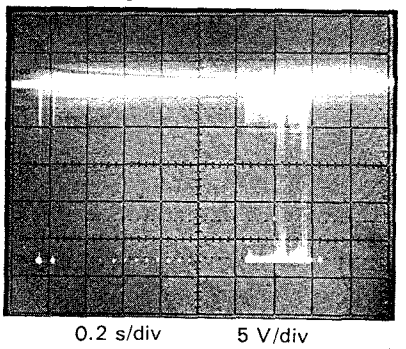

Is about +10 V present at IC801 Pin (1), and is about −10 V present at IC801 Pin (5)?
NO
To power supply circuit section
YES
Does spindle motor stop in stop mode?
NO
Is over ±5 V present at Pin (1) of IC851?
NO
Replace IC801.
YES
Are Pins (10) and (11) of IC401 set to "H"?
NO
Replace IC851.
YES
IC401 or IC201 defective
YES
Does disc start to rotate after it has been loaded?
NO
Is about +6 V present at IC801 Pin (8).
NO
Is above +3 V present at Pin (1) of IC851?
NO
YES
Spindle motor defective
YES
IC801 is open, or R854 is disconnected.
YES
Is Pin (10) of IC401 set to "H"?
NO
IC401 or IC201 defective
YES
Replace IC851.
Does spindle motor stop immediately when the stop mode has been set?
NO
Is about −6 V preset at IC801 Pin (8) in stop mode?
NO
Is over −3 V present at Pin (1) of IC851 in stop mode?
NO
YES
YES
OK
YES
Spindle motor defective
YES
IC801 open, or R854 is disconnected.
Is Pin (11) of IC401 set to "H" in stop mode?
NO
IC401 or IC201 defective
YES
Replace IC851.

Focus Servo Section


Are the power supplies from each power supply circuit OK?
NO
To power supply section
YES
Does the P.U lens move up and down when the disc platter is closed in by pressing the OPEN/CLOSE button?
NO
Is +10 V present at Q554 collector and −10 V at Q555 collector?
NO
YES
YES
Is focus zero cross signal present at Pin ① of IC502 when the lens is up and down? Refer to photo Ⓐ.
YES
Check IC502, 503 and their peripheral components.
NO
Is the waveform as shown in Ⓑ at Pin ① of IC502 when a loaded disc starts to rotate?
YES
IC502 defective; check R576, R577, RA601 and C556 and repair defective part.
NO
Is the waveform as shown in Ⓒ at Pin ① of IC503 when a loaded disc starts to rotate?
YES
Check IC503 or the peripheral CR.
NO
Check the pickup.
YES
1.5V
2S
Is the waveform above of −1.5 V present with interval of 2 seconds at Pin ① of IC503 when closing?
NO
YES
Check if R563 is disconnected and replace it if defective.
NO
IC401 is defective or check slider servo section and loading section; check the pickup.
GND
1.5V
2S
0.2S
Is the waveform above present at Pin ⑫ of IC401 when closing?
YES
Check if Q552, Q553 are short-circuited or open.

Ⓐ Output waveform of focus zero-cross
Minus pulse is generated when focus signal passes near zero.

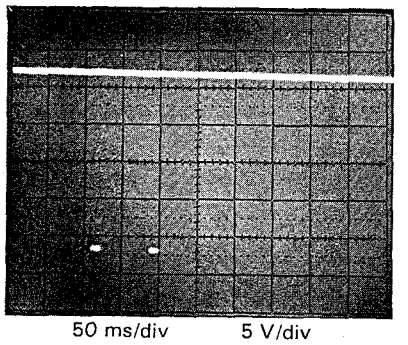
IC502 Pin ①



0.2 s/div 5 V/div

Ⓑ Waveform when focus zero-cross is started to play
Focus zero-cross signal just before play stats; pulse width is about 10 ms.

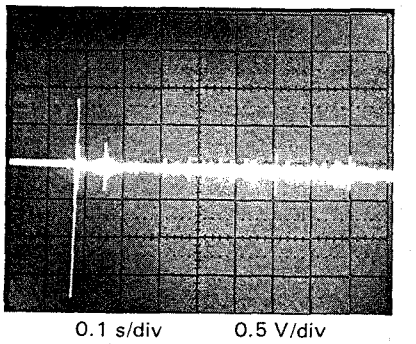
IC502 Pin ①



50 ms/div 5 V/div

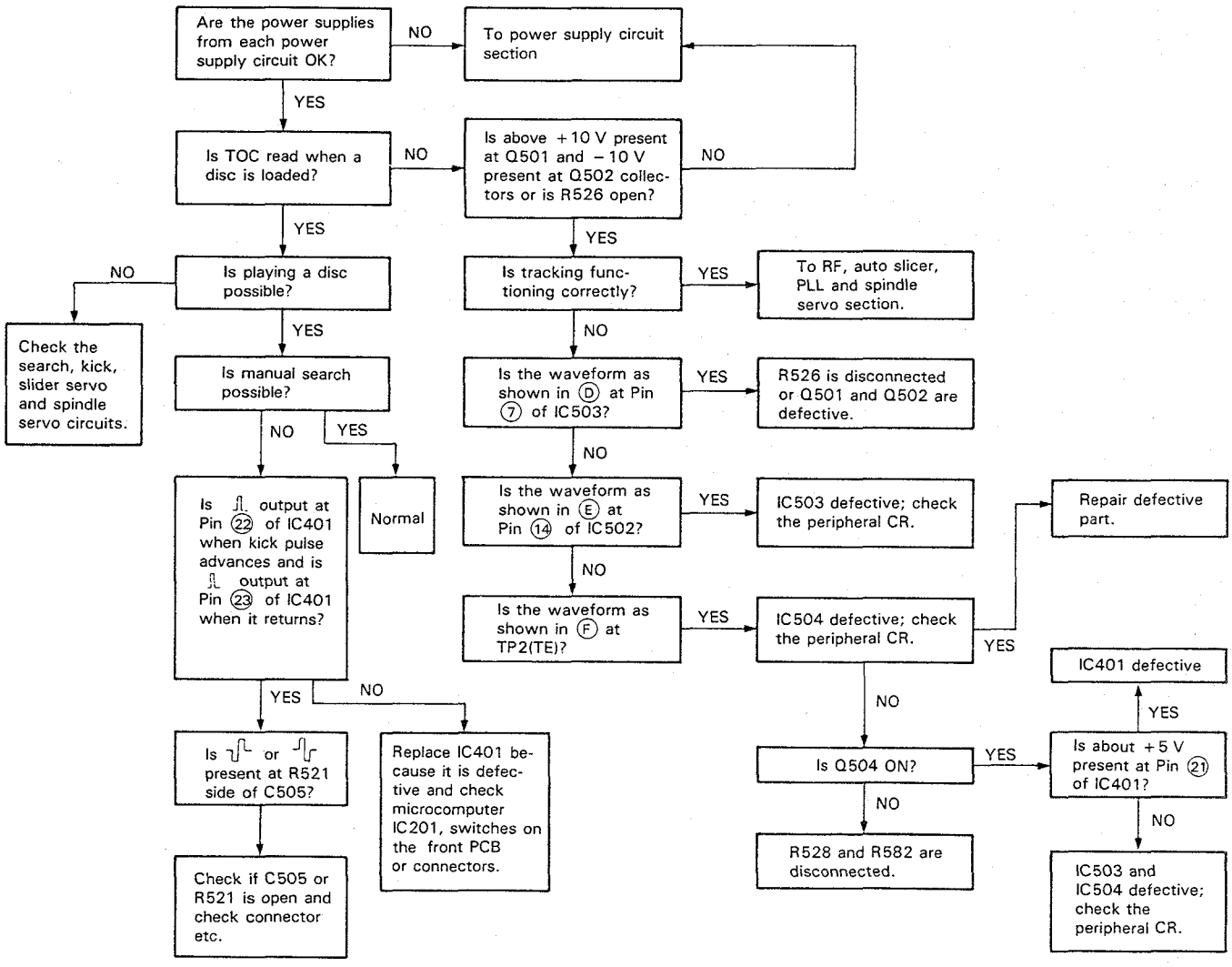
Ⓒ Focus signal when a loaded disc starts to be played
Strong signal is output when focus starts to be obtained but it becomes of small amplitude when it enters in servo loop.

IC503 Pin ①



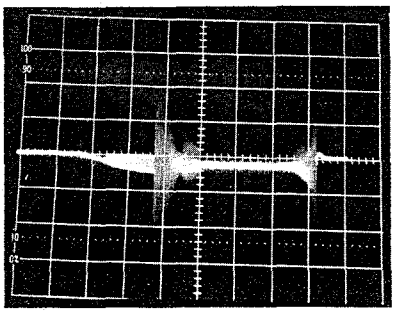
0.1 s/div 0.5 V/div

Tracking Servo Section


Are the power supplies from each power supply circuit OK?
NO
To power supply circuit section
YES
Is TOC read when a disc is loaded?
NO
Is above +10 V present at Q501 and −10 V present at Q502 collectors or is R526 open?
NO
YES
YES
Is playing a disc possible?
NO
Is tracking functioning correctly?
YES
To RF, auto slicer, PLL and spindle servo section.
Check the search, kick, slider servo and spindle servo circuits.
YES
NO
Is manual search possible?
Is the waveform as shown in Ⓓ at Pin ⑦ of IC503?
YES
R526 is disconnected or Q501 and Q502 are defective.
NO
YES
NO
Is output at Pin ㉒ of IC401 when kick pulse advances and is output at Pin ㉓ of IC401 when it returns?
Normal
Is the waveform as shown in Ⓔ at Pin ⑭ of IC502?
YES
IC503 defective; check the peripheral CR.
Repair defective part.
NO
Is the waveform as shown in Ⓕ at TP2(TE)?
YES
IC504 defective; check the peripheral CR.
YES
IC401 defective
YES
NO
NO
Is Q504 ON?
YES
Is about +5 V present at Pin ㉑ of IC401?
Is or present at R521 side of C505?
Replace IC401 because it is defective and check microcomputer IC201, switches on the front PCB or connectors.
NO
NO
R528 and R582 are disconnected.
IC503 and IC504 defective; check the peripheral CR.
Check if C505 or R521 is open and check connector etc.

Ⓓ Waveform when a disc is loaded
Shows until brake is operated after TOC has been read.

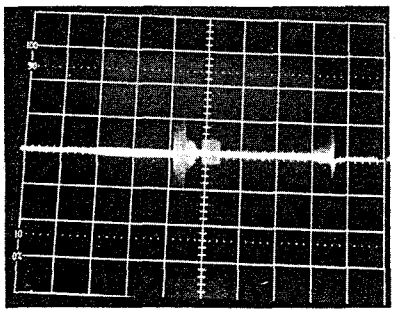
IC503 Pin ⑦



0.5 s/div 1 V/div

Ⓔ Waveform when a disc is loaded
Shows until brake is operated after TOC has been read.

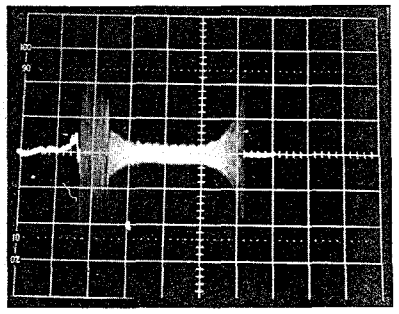
IC502 Pin ⑭



0.5 s/div 1 V/div

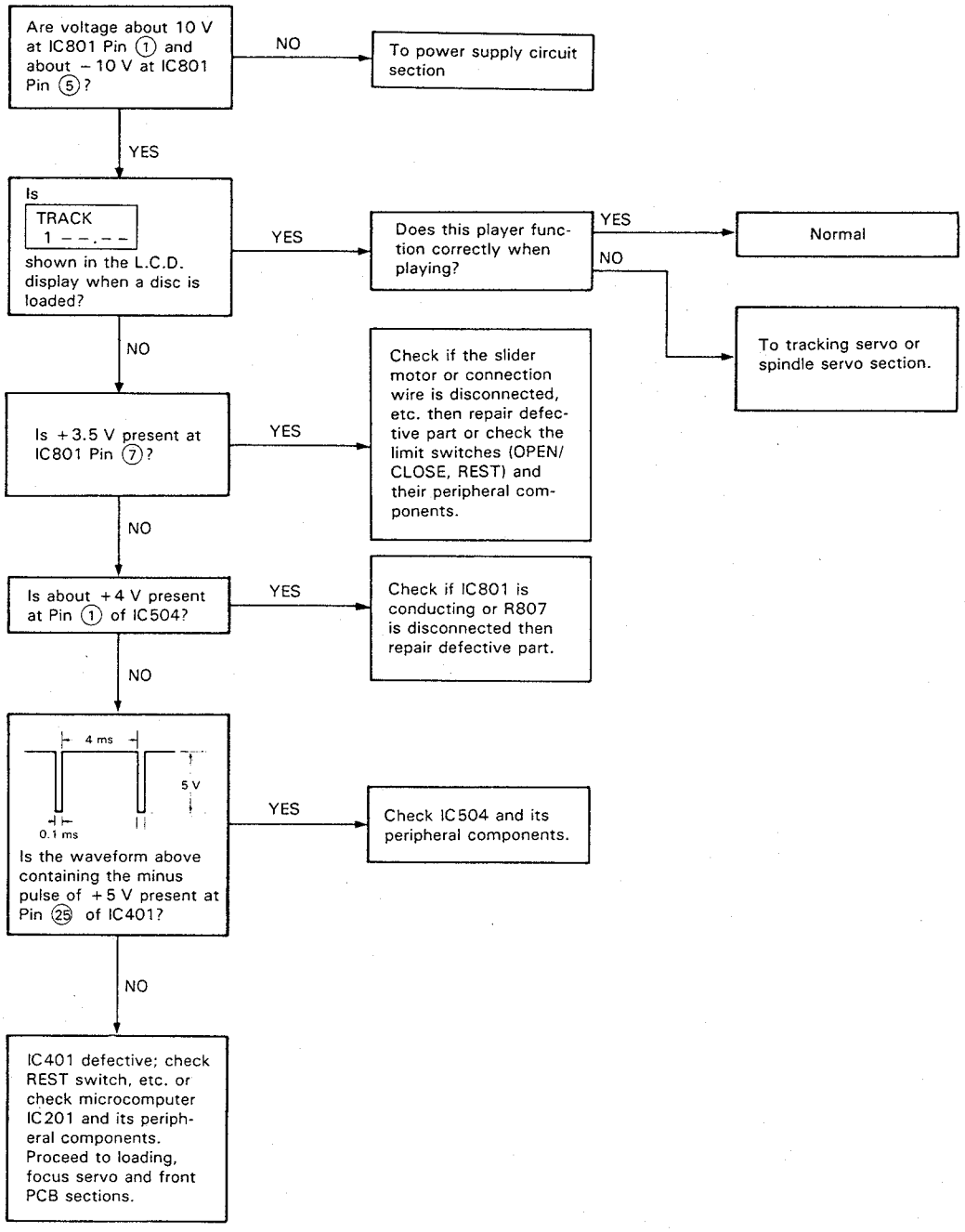
Ⓕ Waveform when a disc is loaded
Shows until brake is operated after TOC has been read.

TP2 (TE)

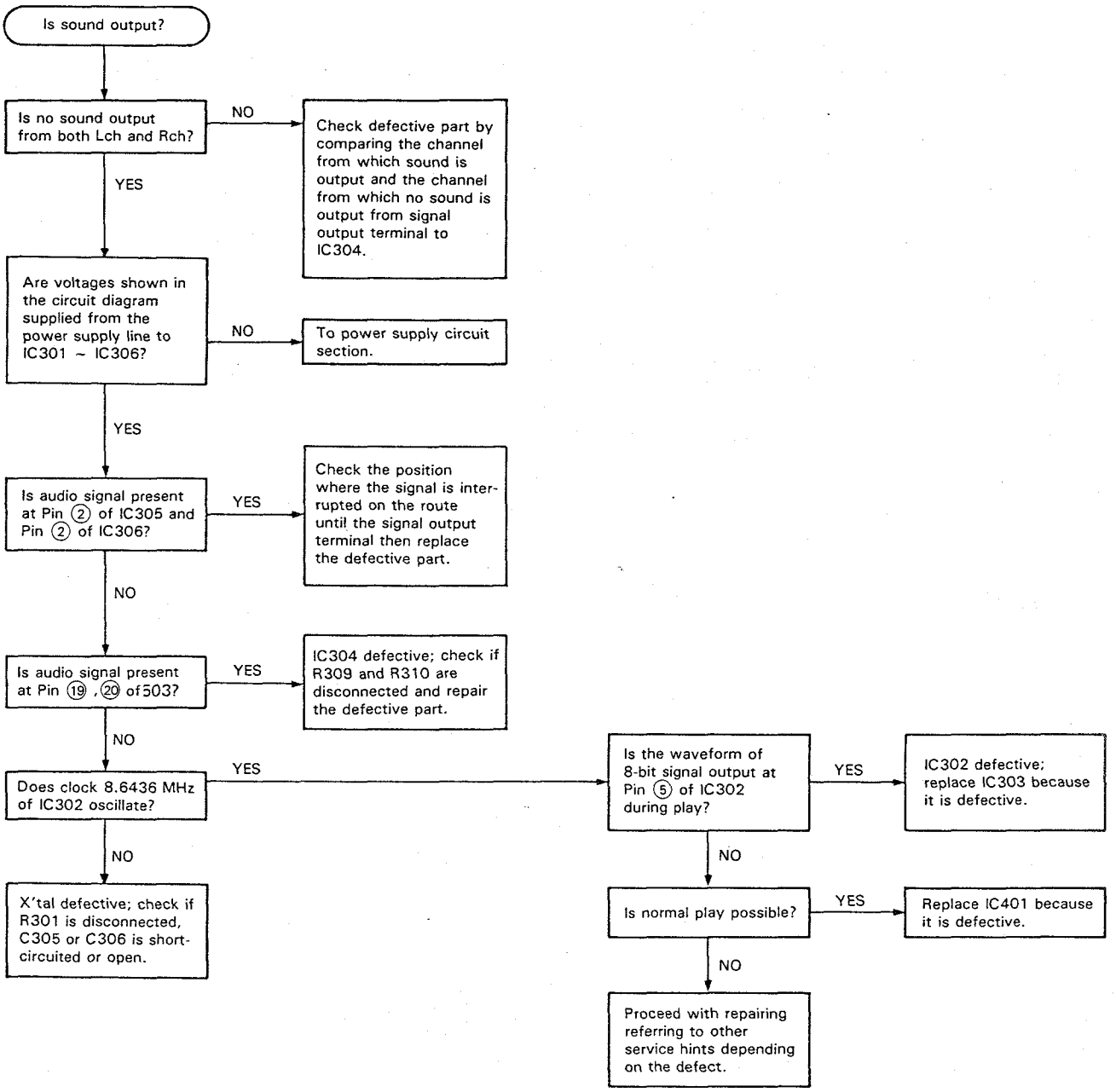


0.5 s/div 1 V/div

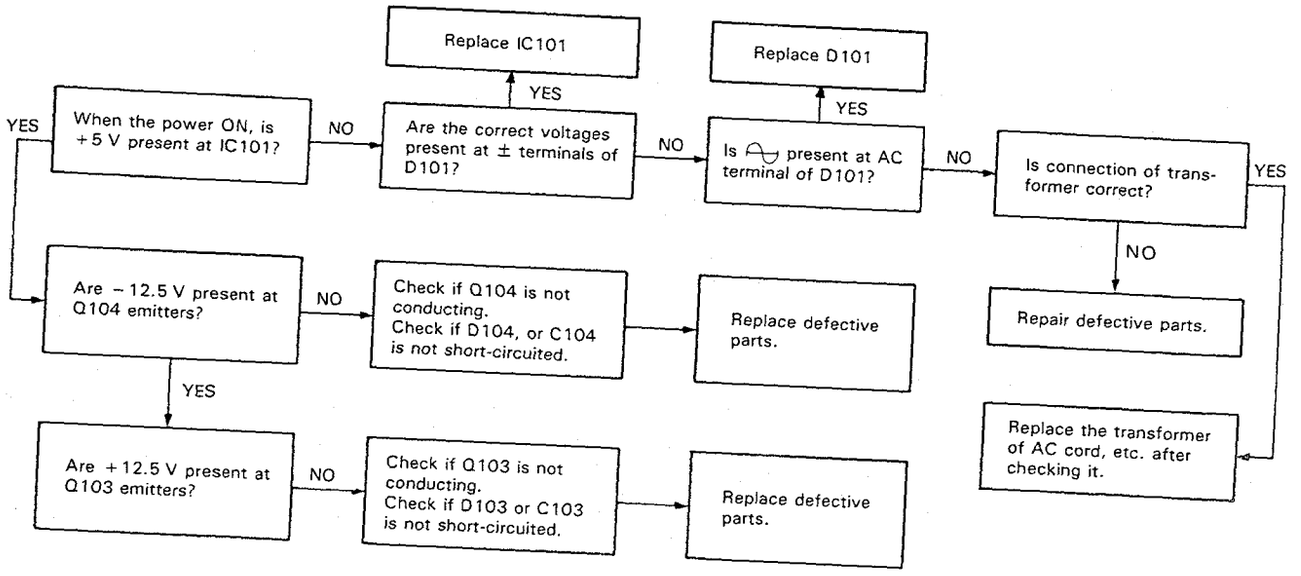
Feed Servo Section


Are voltage about 10 V at IC801 Pin ① and about −10 V at IC801 Pin ⑤?
NO
To power supply circuit section
YES
Is TRACK 1 − −.− − shown in the L.C.D. display when a disc is loaded?
YES
Does this player function correctly when playing?
YES
Normal
NO
To tracking servo or spindle servo section.
NO
Is +3.5 V present at IC801 Pin ⑦?
YES
Check if the slider motor or connection wire is disconnected, etc. then repair defective part or check the limit switches (OPEN/CLOSE, REST) and their peripheral components.
NO
Is about +4 V present at Pin ① of IC504?
YES
Check if IC801 is conducting or R807 is disconnected then repair defective part.
NO
4 ms
5 V
0.1 ms
Is the waveform above containing the minus pulse of +5 V present at Pin ㉕ of IC401?
YES
Check IC504 and its peripheral components.
NO
IC401 defective; check REST switch, etc. or check microcomputer IC201 and its peripheral components. Proceed to loading, focus servo and front PCB sections.

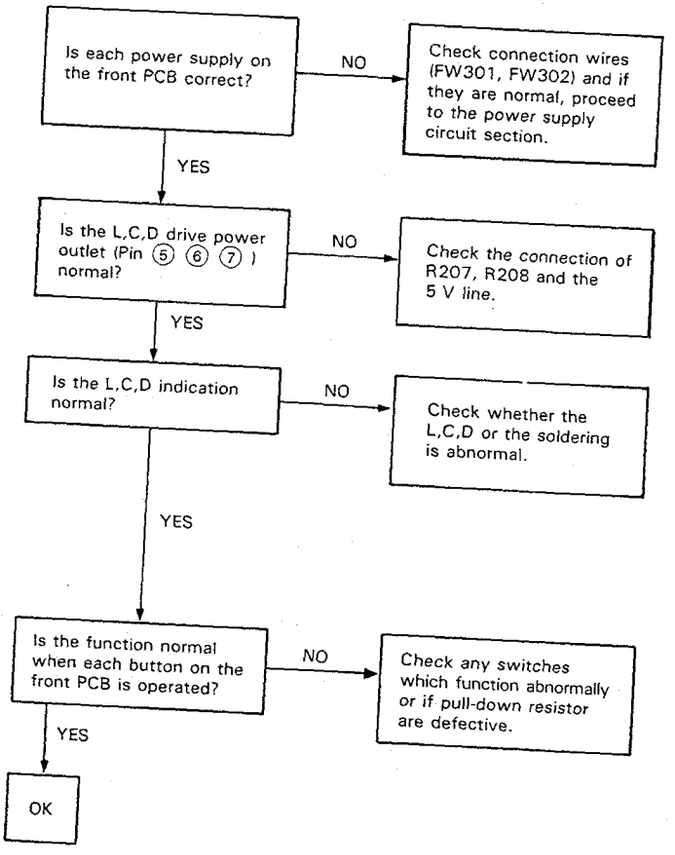
Signal Processing Section


Is sound output?
Is no sound output from both Lch and Rch?
NO
Check defective part by comparing the channel from which sound is output and the channel from which no sound is output from signal output terminal to IC304.
YES
Are voltages shown in the circuit diagram supplied from the power supply line to IC301 ~ IC306?
NO
To power supply circuit section.
YES
Is audio signal present at Pin ② of IC305 and Pin ② of IC306?
YES
Check the position where the signal is interrupted on the route until the signal output terminal then replace the defective part.
NO
Is audio signal present at Pin ⑲ , ⑳ of 503?
YES
IC304 defective; check if R309 and R310 are disconnected and repair the defective part.
NO
Does clock 8.6436 MHz of IC302 oscillate?
YES
Is the waveform of 8-bit signal output at Pin ⑤ of IC302 during play?
YES
IC302 defective; replace IC303 because it is defective.
NO
X'tal defective; check if R301 is disconnected, C305 or C306 is short-circuited or open.
NO
Is normal play possible?
YES
Replace IC401 because it is defective.
NO
Proceed with repairing referring to other service hints depending on the defect.

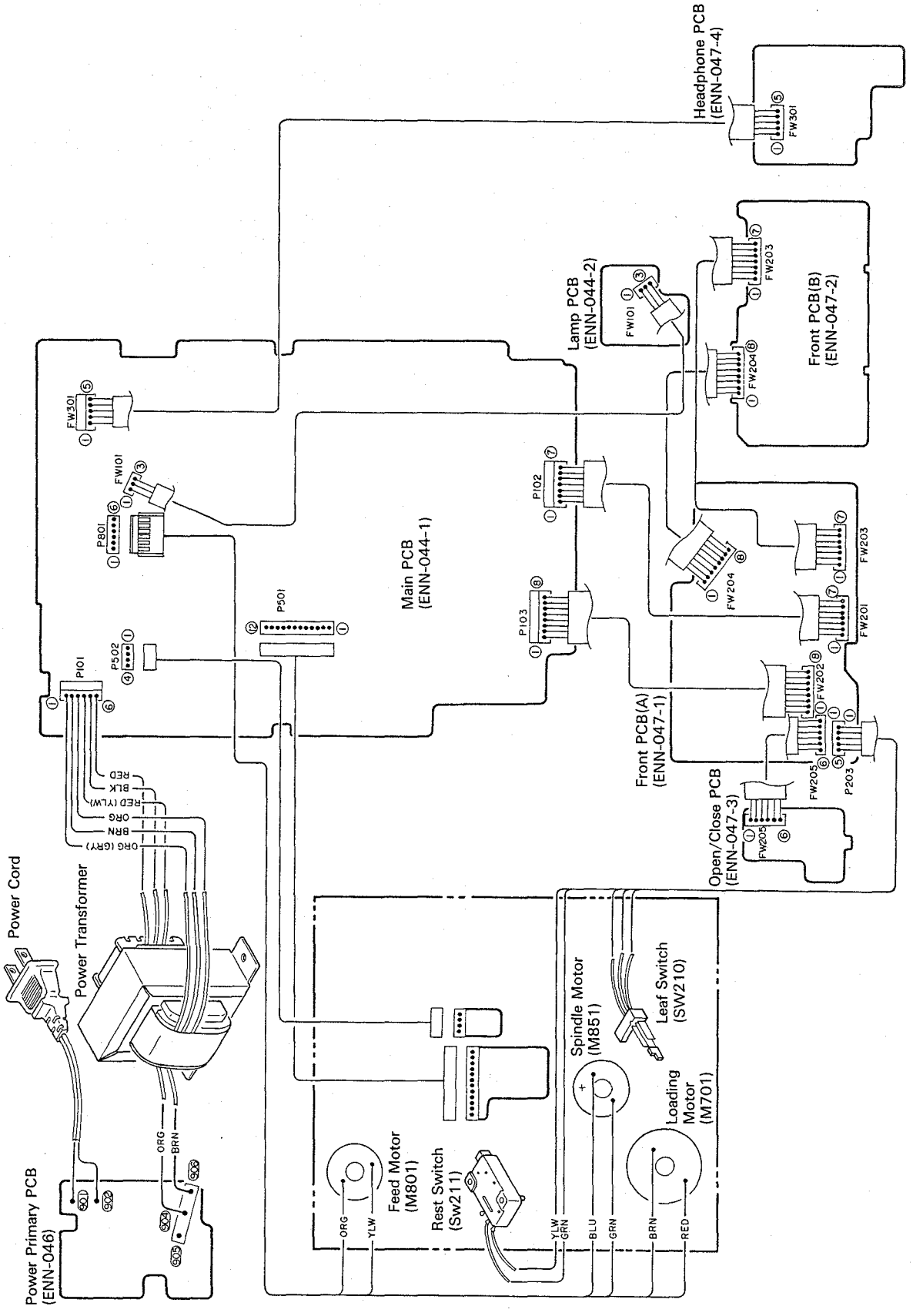
Power Supply Circuit Section


Replace IC101
Replace D101
YES
YES
YES
When the power ON, is +5 V present at IC101?
NO
Are the correct voltages present at ± terminals of D101?
NO
Is ~ present at AC terminal of D101?
NO
Is connection of transformer correct?
YES
NO
Are −12.5 V present at Q104 emitters?
NO
Check if Q104 is not conducting. Check if D104, or C104 is not short-circuited.
Replace defective parts.
Repair defective parts.
YES
Are +12.5 V present at Q103 emitters?
NO
Check if Q103 is not conducting. Check if D103 or C103 is not short-circuited.
Replace defective parts.
Replace the transformer of AC cord, etc. after checking it.

Front PCB Section

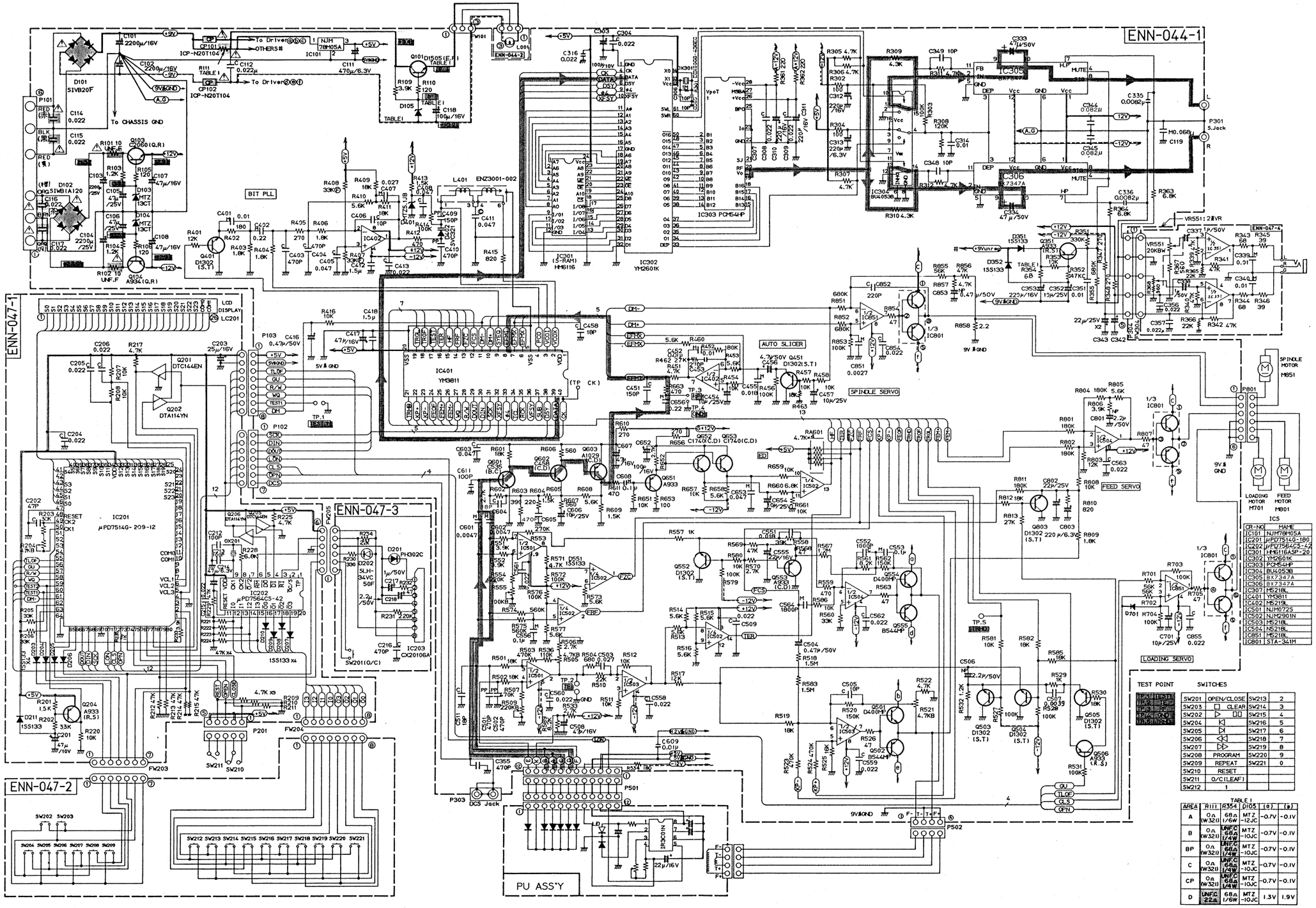

Is each power supply on the front PCB correct?
NO
Check connection wires (FW301, FW302) and if they are normal, proceed to the power supply circuit section.
YES
Is the L,C,D drive power outlet (Pin ⑤ ⑥ ⑦) normal?
NO
Check the connection of R207, R208 and the 5 V line.
YES
Is the L,C,D indication normal?
NO
Check whether the L,C,D or the soldering is abnormal.
YES
Is the function normal when each button on the front PCB is operated?
NO
Check any switches which function abnormally or if pull-down resistor are defective.
YES
OK

Connection Diagram



Schematic Diagrams

(1) Main Section



SW201	OPEN/CLOSE	SW213	2
SW203	□ CLEAR	SW214	3
SW202	▷ □□	SW215	4
SW204	◁◁	SW216	5
SW205	▷|	SW217	6
SW206	◁◁	SW218	7
SW207	▷▷	SW219	8
SW208	PROGRAM	SW220	9
SW209	REPEAT	SW221	0
SW210	RESET		
SW211	O/C(LEAF)		
SW212	1		

TABLE I

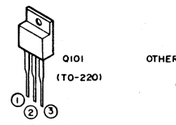
AREA	R111	R354	DI05	(e)	(p)
A	0Ω (W321)	68Ω 1/6W	MTZ -12JC	-0.7V	-0.1V
B	0Ω (W321)	UNFC 68Ω 1/4W	MTZ -10JC	-0.7V	-0.1V
BP	0Ω (W321)	UNFC 68Ω 1/4W	MTZ -10JC	-0.7V	-0.1V
C	0Ω (W321)	UNFC 68Ω 1/4W	MTZ -10JC	-0.7V	-0.1V
CP	0Ω (W321)	UNFC 68Ω 1/4W	MTZ -10JC	-0.7V	-0.1V
D	UNFC 22Ω	68Ω 1/6W	MTZ -10JC	1.3V	1.9V

ICS

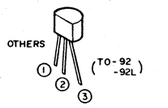
CR-NO	NAME
IC101	NJM78M05A
IC201	μPD7514G-180
IC202	μPD7564G5-42
IC301	HM6116ASP-20
IC302	YM2601K
IC303	PCM54HP
IC304	BU4053B
IC305	BX7347A
IC306	BX7347A
IC307	HS218L
IC401	YM3811
IC402	HS219L
IC501	NJM0772S
IC502	NJM2901N
IC503	HS218L
IC504	HS218L
IC851	HS218L
IC801	STA-341M

(2) Power Supply Section

TRANSISTOR



TRANSISTOR



DI01, DI02

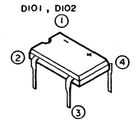
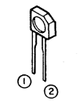
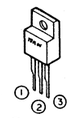


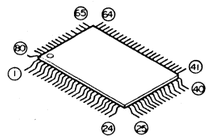
PHOTO DIODE D201



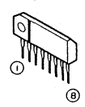
IC101 (78M05)



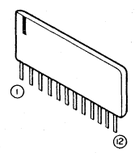
IC201 (μPD7514G-180)



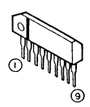
IC203, IC402 IC503 IC504 IC851 (SIP)



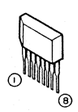
IC305, IC306



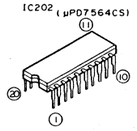
IC501 (SIP)



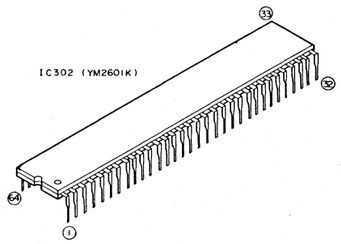
IC801



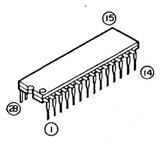
IC202 (μPD7564CS)



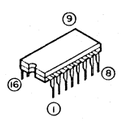
IC302 (YM2601K)



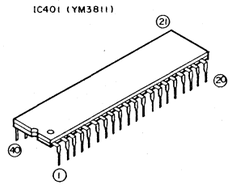
IC303 (PCM54HP)



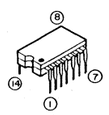
IC304 (BU4053B)



IC401 (YM3811)



IC502 (DIP)

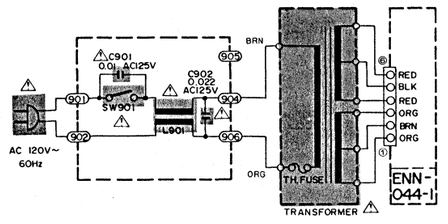


Notes:

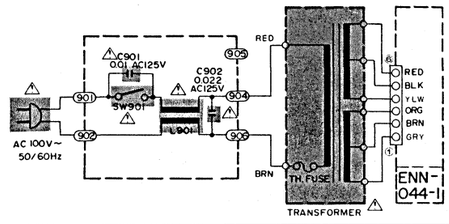
1. ▬ shows DC voltage to the chassis with no signal input.
2. —— indicates positive B power supply.
3. ------ indicates negative B power supply.
4. ▬ indicates signal path.
5. When replacing the parts in the darkened area (▬) and those marked with ⚠, be sure to use the designated parts to ensure safety.
6. This is the standard circuit diagram. The design and contents are subject to change without notice.

POWER SUPPLY BLOCK

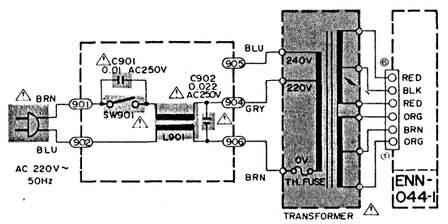
J (for U.S.A.)
C (for Canada)



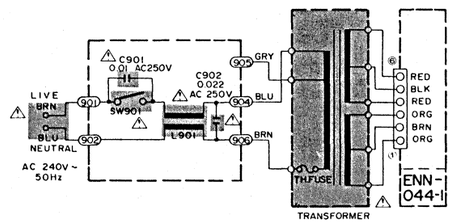
D (for Domestic/Japan)



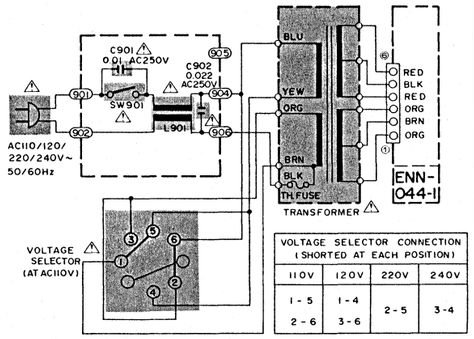
E (for Continental Europe)
G (for West Germany)



A (for Australia)
BS (for U.K.)



P (for U.S. Military Market)
U (for Other Areas)

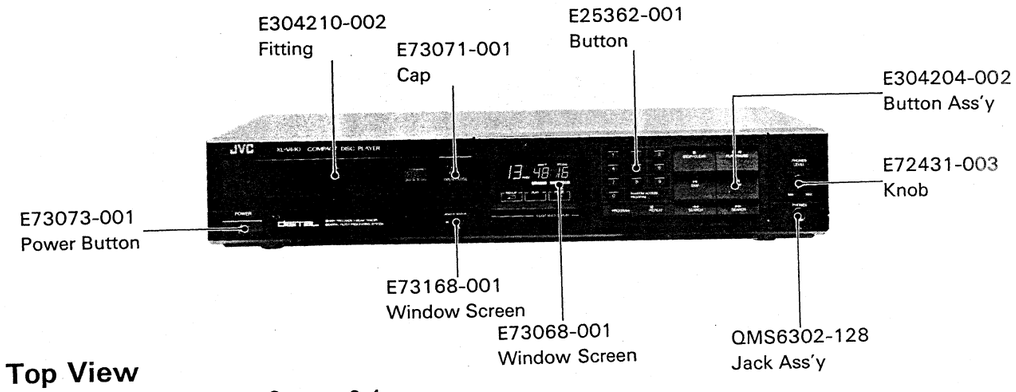


VOLTAGE SELECTOR CONNECTION (SHORTED AT EACH POSITION)

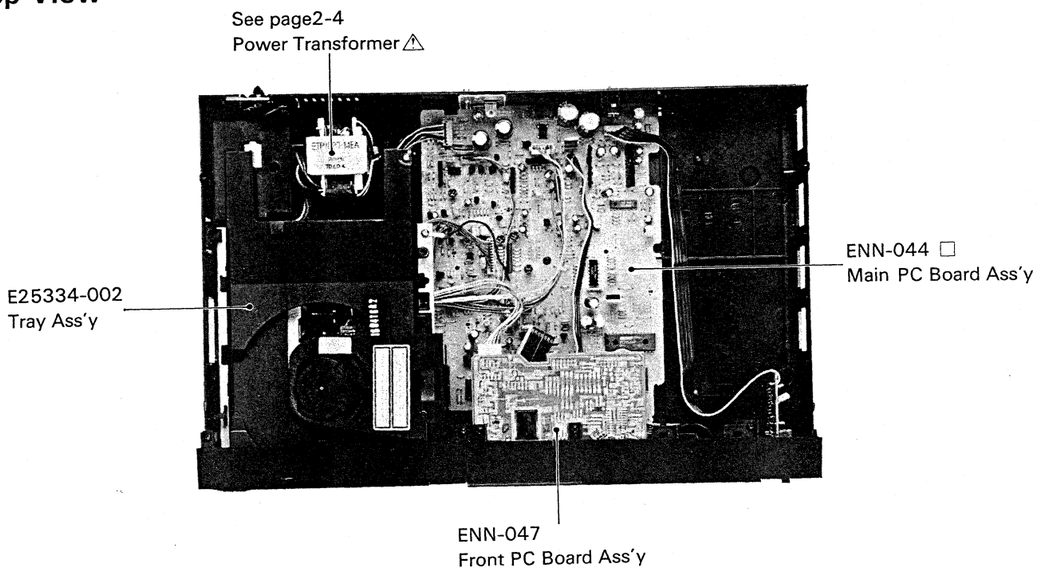
110V	120V	220V	240V
1 - 5 2 - 6	1 - 4 3 - 6	2 - 5	3 - 4

Main Parts Location

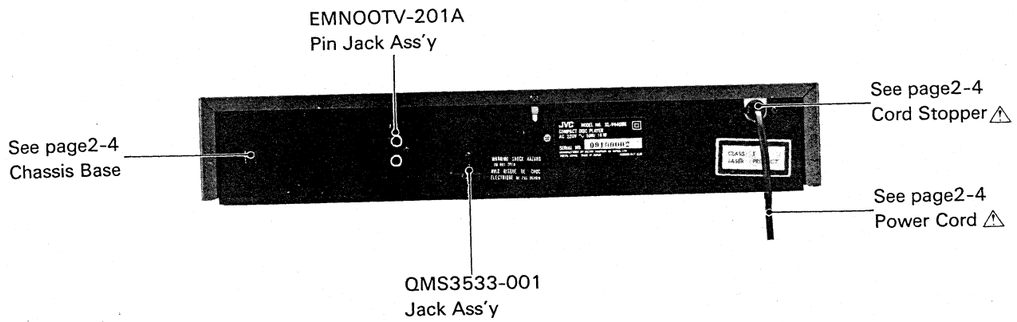
■ Front View



■ Top View



■ Rear View



⚠ : Safety Parts

PARTS LIST

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Main Parts Location 2-2
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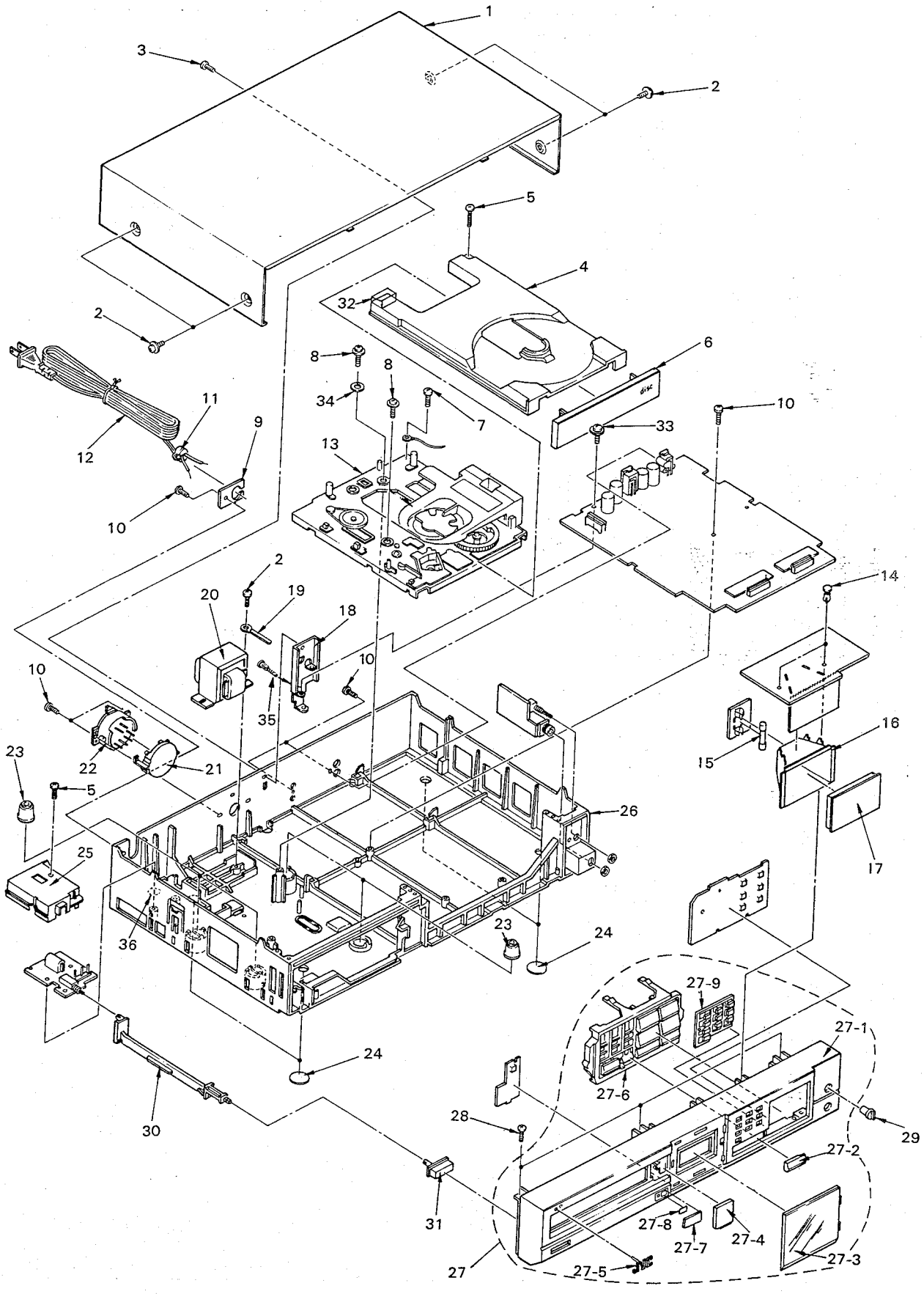
Mechanism Ass'y 2-5
Printed Circuit Board Ass'y and Parts List 2-7
■ ENN-044☐ Main PC Board Ass'y 2-7
■ ENN-047Ⓡ Front PC Board Ass'y 2-11
■ ENN-046☐ Primary PC Board Ass'y 2-13
Packing Materials and Parts Numbers 2-14
Accessories List 2-15

Exploded View and Part List



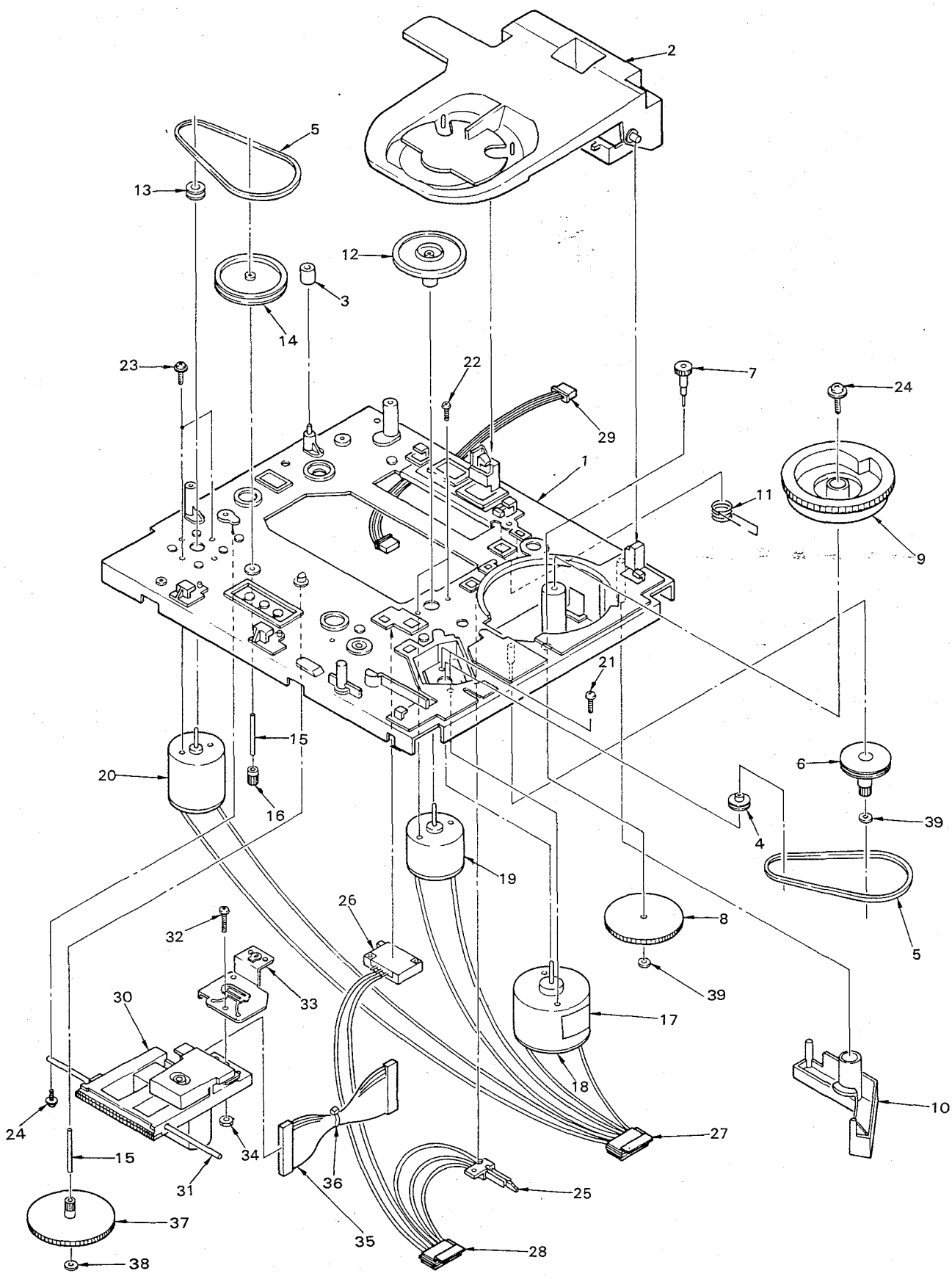
Exploded View and Parts List

⚠	Item No.	Parts Number	Parts Name	Q'ty	Description	Areas
	1	E25335-001	Metal Cover	1		
	2	E73078-001	Tapping Screw	5		
	3	SHSB3012M	Screw	1		
	4	E25334-002	Tray Ass'y	1		
	5	SBSF3014Z	Screw	2		
	6	E304210-002	Fitting	1		
	7	SBSE3008N	Screw	1		
	8	E65923-003	Screw	2		
	9	E73211-001	Cord Holder	1		
	10	SBSE3008M	Screw	3		
⚠	11	QHS3876-162	Cord Stopper	1		J, C, P, PG, E, AG, ES, U
⚠		QHS3876-162BS	Cord Stopper	1		BS
⚠	12	QMP1200-200	Power Cord	1		J, C
⚠		QMP7600-200	Power Cord	1		P, PG, U
⚠		QMP3900-200	Power Cord	1		E, G, ES
⚠		QMP2560-244	Power Cord	1		A
⚠		QMP9017-008BS	Power Cord	1		BS
	13	—	Mechanism Ass'y	1	See page 2-5.	
	14	E48729-007	Plastic Rivet	2		
	15	ELP4101-003	Fuse Lamp	1		
	16	E304209-001	Reflector	1		
	17	E73077-003	Sheet Ass'y	1		
	18	E73076-002	Earth Bracket	1		
	19	E72018-001	Wire Clamp	1		
⚠	20	ETP1020-14JA	Power Transformer	1		J, C
⚠		ETP1020-14MA	Power Transformer	1		P, PG, U
⚠		ETP1020-14EA	Power Transformer	1		E, A, G, ES
⚠		ETP1020-14EABS	Power Transformer	1		BS
	21	E302764-001	Voltage Selector Cover	1		P, PG, U
⚠	22	QSR0085-008U	Voltage Selector	1		P, PG, U
	23	E72393-001	FL. Rubber	4		
	24	E73072-001	Foot	4		
	25	E304207-001	Primary Cover	1		
	26	E11278-005	Chassis Base	1		J,C,E,A,G,ES,BS
		E11278-006	Chassis Base	1		P, PG, U
	27	EFP-XLV440BKE	Front Panel Ass'y	1		
	27-1	E11277-201	Front Panel	1		
	27-2	E73070-001	Cap	1		
	27-3	E73068-001	Window Screen	1		
	27-4	E73071-001	Cap	1		
	27-5	E72968-001	JVC Mark	1		
	27-6	E304204-002	Button Ass'y	1		
	27-7	E73168-001	Window Screen	1		
	27-8	E73169-001	Filter	1		
	27-9	E25362-001	Button	1		
	28	SBSF3008M	Screw	7		
	29	E72431-003	Knob	1		
	30	E304208-001	Push Shaft	1		
	31	E73073-001	Power Button	1		
	—	E25096-217	Rating Label	1		J
	—	E25096-117	Rating Label	1		C
	—	E25096-317	Rating Label	1		P, PG, U
	—	E25096-517	Rating Label	1		E
	—	E25096-517F	Rating Label	1		G
	—	E25943-046	Rating Label	1		A
	—	E25943-046BS	Rating Label	1		BS
	—	E25096-617	Rating Label	1		ES
	32	E72572-007	Spacer	1		
	33	GBSE3008CC	Screw	1		
	34	E73322-001	Spacer	1		
	35	E66052-002	Special Screw	1		
	36	E72634-002	Spacer	1		

⚠: Safety Parts

The Marks for Designated Areas		
J . . . . . U.S.A.	E . . . . . Europe	ES . . . . . Spain
C . . . . . Canada	G . . . . . West Germany	P, PG . . . . . U.S. Military Market
A . . . . . Australia	BS . . . . . U.K.	U . . . . . Other Countries
		No mark indicates all areas.

Mechanism Assembly



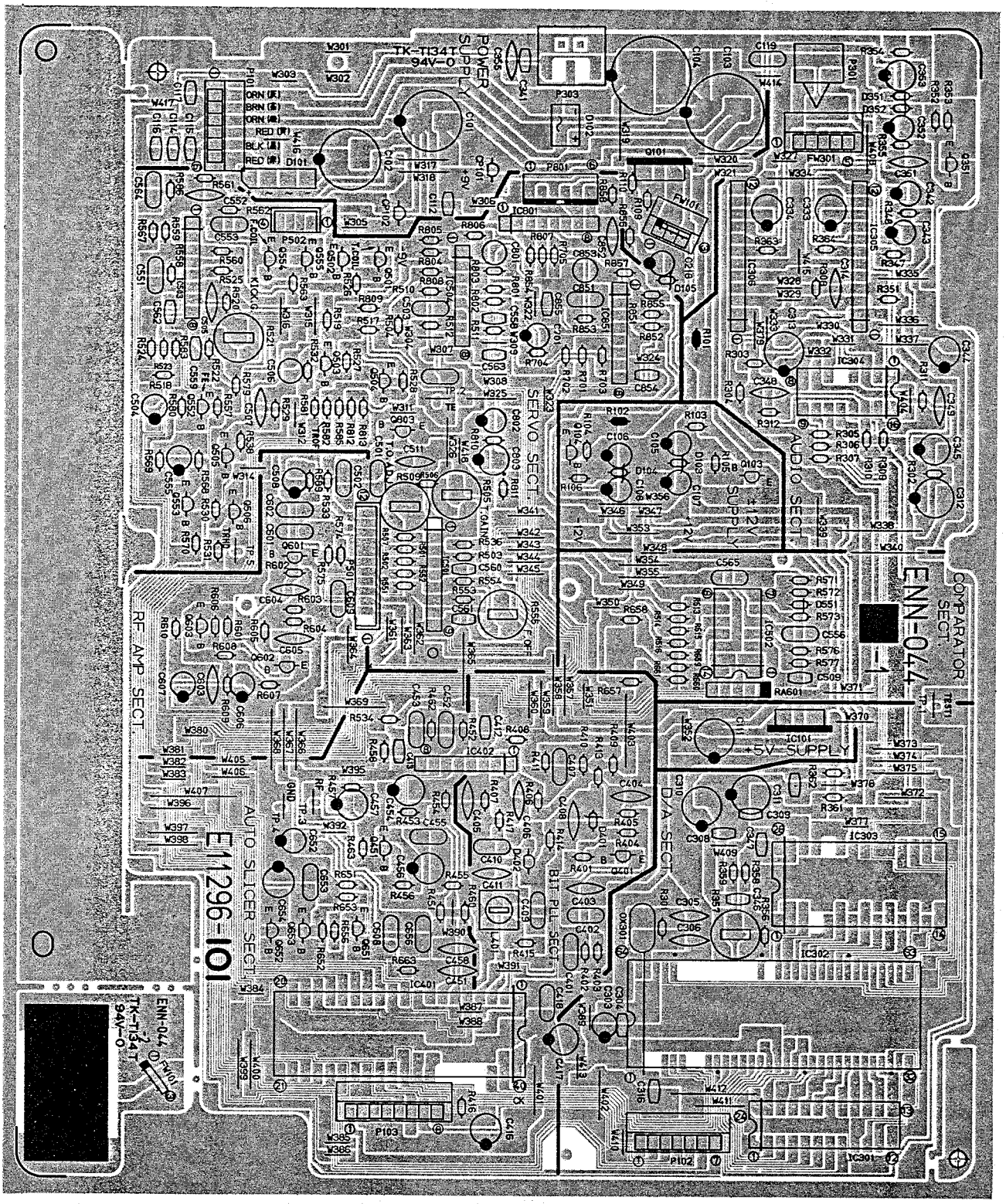
Mechanism Assembly

⚠	Item No.	Parts Number	Parts Name	Q'ty	Description	Areas
	1	E11274-001	Base Ass'y	1		
	2	E304201-001	Holder Ass'y	1		
	3	E70267-003	R Tube	1		
	4	E72376-001	M. Pulley	1		
	5	E69879-002	Belt	2		
	6	E73061-001	Pulley (L)	1		
	7	E72378-001	Gear (X)	1		
	8	E73062-001	Gear (Y)	1		
	9	E25332-001	Main Gear	1		
	10	E303831-003	Lever	1		
	11	E72382-001	Tor. Spring	1		
	12	E72379-001	Turntable	1		
	13	E73060-001	M. Pulley	1		
	14	E73063-001	Pulley (F)	1		
	15	E71731-002	Shaft	2		
	16	E73064-001	Feed Gear (A)	1		
	17	E71967-002	Label	1		
	18	E71569-001	Motor	1		
	19	RF-310T-10470	Motor	1		
	20	RF-260T-08450	Motor	1		
	21	SDSP2604N	Screw	2		
	22	E72963-203	W.H. Screw	2		
	23	E72963-268	W.H. Screw	2		
	24	E65923-004	T. Screw	2		
	25	ESB1200-003	Leaf Switch	1		
	26	QSS1214-002	Slide Push SW	1		
	27	EWS016-090	SKT Wire Ass'y	1		
	28	EWS015-124	SKT Wire Ass'y	1		
	29	EWS254-B006	SKT Wire Ass'y	1		
	30	OPTIMA-2	Pickup Ass'y	1		
	31	E73066-001	Feed Shaft	1		
	32	SPSP2608Z	Screw	1		
	33	E304203-002	Pickup Base Ass'y	1		
	34	NNS2600Z	Nut	1		
	35	EWS25C-004	SKT Wire Ass'y	1		
	36	E33754-001	Tie Band	1		
	37	E73067-001	Feed Gear (B)	1		
	38	E72024-001	Speed Nut	1		
	39	E60912-001	Speed Nut	2		

Printed Circuit Board Ass'y and Parts List

■ ENN-044□ Main PC Board Ass'y

Note: ENN-044□ varies according to the areas employed. See note (1) when placing an order.



Note (1)

P.C. Board Ass'y	Designated Areas
ENN-044Ⓑ	Canada, U.S. Military Market, Australia, Europe, West Germany, U.K., Spain, Other Countries
ENN-044Ⓓ	U.S.A.

Transistors

⚠	ITEM	PART NUMBER	DESCRIPTION	MAKER	AREA
	Q101	2SD1505(E,F)	SILICON	ROHM	
	Q103	2SC2060(Q,R)	SILICON	ROHM	
	Q104	2SA934(Q,R)	SILICON	ROHM	
	Q351	2SA933(R,S)	SILICON	ROHM	
	Q401	2SD1302(S,T)	SILICON	MATSUSHITA	
	Q451	2SD1302(S,T)	SILICON	MATSUSHITA	
	Q501	2SD400MP(E,F)	SILICON	SANYO	
	Q502	2SB544MP(E,F)	SILICON	SANYO	
	Q503	2SD1302(S,T)	SILICON	MATSUSHITA	
	Q504	2SD1302(S,T)	SILICON	MATSUSHITA	
	Q505	2SD1302(S,T)	SILICON	MATSUSHITA	
	Q506	2SA933(R,S)	SILICON	ROHM	
	Q552	2SD1302(S,T)	SILICON	MATSUSHITA	
	Q553	2SA933(R,S)	SILICON	ROHM	
	Q554	2SD400MP(E,F)	SILICON	SANYO	
	Q555	2SB544MP(E,F)	SILICON	SANYO	
	Q601	2SC535(B,C)	SILICON	HITACHI	
	Q602	2SC458(C,D)	SILICON	HITACHI	
	Q603	2SA1029(C,D)	SILICON	HITACHI	
	Q651	2SA933(R,S)	SILICON	ROHM	
	Q652	2SC1740(R,S)	SILICON	ROHM	
	Q653	2SC1740(R,S)	SILICON	ROHM	
	Q803	2SD1302(S,T)	SILICON	MATSUSHITA	

⚠ : SAFETY PARTS

Ics

⚠	ITEM	PART NUMBER	DESCRIPTION	MAKER	AREA
	IC101	NJM78M05A	I.C.		
	IC301	HM6116ASP-20	I.C.	HITACHI	
	IC302	YM-2601-K	I.C.		
	IC303	PCM54HP	I.C.		
	IC304	BU4053B	I.C.	ROHM	
	IC305	BX7347B	I.C.	ROHM	
	IC306	BX7347B	I.C.	ROHM	
	IC401	YM3811	I.C.		
	IC402	M5209L	I.C.		
	IC501	NJM072S	I.C.		
	IC502	NJM2901N	I.C.		
	IC503	M5218L	I.C.	MITSUBISHI	
	IC504	M5218L	I.C.	MITSUBISHI	
	IC801	STA341M	I.C.		
	IC851	M5218L	I.C.	MITSUBISHI	

⚠ : SAFETY PARTS

Diodes

⚠	ITEM	PART NUMBER	DESCRIPTION	MAKER	AREA
	D101	S1VB20F	SILICON		
	D102	S1WB(A)20	SILICON		
	D103	MTZ13C	ZENER	ROHM	
	D104	MTZ13C	ZENER	ROHM	
	D105	MTZ10C	ZENER	ROHM	
	D351	1SS133	SILICON	ROHM	
	D352	1SS133	SILICON	ROHM	
	D401	MTZ5.1JB	ZENER		
	D402	SVC321-AW	VARICAP	SANYO	
	D701	1SS133	SILICON	ROHM	

⚠ : SAFETY PARTS

Capacitors

⚠	ITEM	PART NUMBER	DESCRIPTION			AREA
	C101	QETB1CM-228M	2200MF	16V	ELECTRO	
	C102	QETB1CM-228M	2200MF	16V	ELECTRO	
	C103	QETB1EM-228	2200MF	25V	ELECTRO	
	C104	QETB1EM-228	2200MF	25V	ELECTRO	
	C105	QETB1EM-476	47MF	25V	ELECTRO	
	C106	QETB1EM-476	47MF	25V	ELECTRO	
	C107	QETB1CM-476	47MF	16V	ELECTRO	
	C108	QETB1CM-476	47MF	16V	ELECTRO	
	C111	QETB0JM-477	470MF	6.3V	ELECTRO	
	C112	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C114	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C115	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C116	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C117	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C118	QETB1CM-107	100MF	16V	ELECTRO	
	C119	QFN81HJ-683	0.068MF	50V	MYLAR	
	C303	QETB1AM-107	100MF	10V	ELECTRO	
	C304	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C305	QCS21HJ-100	10PF	50V	CERAMIC	
	C306	QCS21HJ-100	10PF	50V	CERAMIC	
	C308	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C309	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C310	QETB1CM-227	220MF	16V	ELECTRO	
	C311	QETB1CM-227	220MF	16V	ELECTRO	
	C312	QETB1CM-227	220MF	16V	ELECTRO	
	C313	QETB0JM-227	220MF	6.3V	ELECTRO	
	C314	QCF21HP-103	0.01MF	50V	CERAMIC	
	C316	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C333	EEZ5002-336	33MF	50V	ELECTRO	
	C334	EEZ5002-336	33MF	50V	ELECTRO	
	C335	QFN81HJ-822	8200PF	50V	MYLAR	
	C336	QFN81HJ-822	8200PF	50V	MYLAR	
	C342	QETB1EM-226	22MF	25V	ELECTRO	
	C343	QETB1EM-226	22MF	25V	ELECTRO	
	C344	QFN81HJ-823	0.082MF	50V	ELECTRO	
	C345	QFN81HJ-823	0.082MF	50V	ELECTRO	
	C348	QCS21HJ-100	10PF	50V	CERAMIC	
	C349	QCS21HJ-100	10PF	50V	CERAMIC	
	C351	QCF21HP-103	0.01MF	50V	CERAMIC	
	C352	QETB1EM-106	10MF	25V	ELECTRO	
	C353	QETB1CM-227	220MF	16V	ELECTRO	
	C355	QCS21HJ-471	470PF	50V	CERAMIC	
	C401	QFN81HJ-103	0.01MF	50V	MYLAR	
	C402	QFN81HJ-224	0.22MF	50V	MYLAR	
	C403	QCS21HJ-471	470PF	50V	CERAMIC	
	C404	QCS21HJ-471	470PF	50V	CERAMIC	
	C405	QCF21HP-473	0.047MF	50V	CERAMIC	
	C406	QCS21HJ-100	10PF	50V	CERAMIC	
	C407	QFN81HJ-273	0.027MF	50V	MYLAR	
	C408	QCF21HP-473	0.047MF	50V	CERAMIC	
	C409	QFP81HJ-151	150PF	50V	POLY	
	C410	QFP81HJ-471	470PF	50V	POLY	
	C411	QCF21HP-473	0.047MF	50V	CERAMIC	
	C412	QCZ0202-155	1.5MF		CERAMIC	
	C413	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C416	QETB1HM-475	4.7MF	50V	ELECTRO	
	C417	QETB1CM-476	47MF	16V	ELECTRO	
	C418	QCZ0202-155	1.5MF		CERAMIC	
	C451	QCS21HJ-151	150PF	50V	CERAMIC	
	C452	QFN81HJ-103	0.01MF	50V	MYLAR	
	C453	QCS21HJ-271	270PF	50V	CERAMIC	
	C454	QETB1EM-106	10MF	25V	ELECTRO	
	C455	QFN81HJ-183	0.018MF	50V	MYLAR	
	C456	QETB1HM-475	4.7MF	50V	ELECTRO	
	C457	QETB1EM-106	10MF	25V	ELECTRO	
	C458	QCS21HJ-180	18PF	50V	CERAMIC	
	C501	QFP81HJ-471	470PF	50V	POLY	
	C502	QFP81HJ-471	470PF	50V	POLY	
	C503	QFN81HJ-273	0.027MF	50V	MYLAR	
	C504	QETB1HM-474	0.47MF	50V	ELECTRO	
	C505	QCS21HJ-100	10PF	50V	CERAMIC	
	C506	QEN51HM-225	2.2MF	50V	NON POLE	
	C507	QFN81HJ-393	0.039MF	50V	MYLAR	
	C508	QETB1CM-476	47MF	16V	ELECTRO	
	C509	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C511	QCS21HJ-180	18PF	50V	CERAMIC	
	C551	QFN81HJ-183	0.018MF	50V	MYLAR	
	C552	QCF21HP-102	1000PF	50V	CERAMIC	
	C553	QFN81HJ-104	0.1MF	50V	MYLAR	
	C555	QETB1CM-226	22MF	16V	ELECTRO	
	C556	QFN81HJ-104	0.1MF	50V	MYLAR	
	C558	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C559	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C560	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C561	QCHB1EZ-223	0.022MF	25V	CERAMIC	

⚠ : SAFETY PARTS

Capacitors

⚠	ITEM	PART NUMBER	DESCRIPTION			AREA
	C562	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C563	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C601	QFN81HJ-472	4700PF	50V	MYLAR	
	C602	QFN81HJ-472	4700PF	50V	MYLAR	
	C603	QCF21HP-473	0.047MF	50V	CERAMIC	
	C604	QCS21HJ-180	18PF	50V	CERAMIC	
	C605	QCS21HJ-471	470PF	50V	CERAMIC	
	C606	QETB1EM-106	10MF	25V	ELECTRO	
	C607	QETB1CM-476	47MF	16V	ELECTRO	
	C608	QFN81HJ-104	0.1MF	50V	MYLAR	
	C609	QFN81HJ-104	0.1MF	50V	MYLAR	
	C611	QCS21HJ-101	100PF	50V	CERAMIC	
	C652	QETB1CM-107	100MF	16V	ELECTRO	
	C653	QFN81HJ-473	0.047MF	50V	MYLAR	
	C654	QETB1EM-106	10MF	25V	ELECTRO	
	C656	QFN81HJ-224	0.22MF	50V	MYLAR	
	C701	QETB1EM-106	10MF	25V	ELECTRO	
	C801	QEN51HM-225	2.2MF	50V	NON POLE	
	C802	QETB1EM-226	22MF	25V	ELECTRO	
	C803	QETB0JM-227	220MF	6.3V	ELECTRO	
	C851	QFN81HJ-272	2700PF	50V	MYLAR	
	C852	QCS21HJ-221	220PF	50V	CERAMIC	
	C853	QEN51HM-474	0.47MF	50V	NON POLE	
	C854	QCHB1EZ-223Y	0.022MF	25V	CERAMIC	
	C855	QCHB1EZ-223Y	0.022MF	25V	CERAMIC	

⚠ : SAFETY PARTS

Resistors

⚠	ITEM	PART NUMBER	DESCRIPTION			AREA
⚠	R101	QRZ0077-100	10	1/4W	FUSIBLE	
⚠	R102	QRZ0077-100	10	1/4W	FUSIBLE	
	R103	QRD161J-122	1.2K	1/6W	CARBON	
	R104	QRD161J-122	1.2K	1/6W	CARBON	
	R105	QRD161J-121	120	1/6W	CARBON	
	R106	QRD161J-121	120	1/6W	CARBON	
	R109	QRD161J-392	3.9K	1/6W	CARBON	
	R110	QRD161J-121	120	1/6W	CARBON	
⚠	R111	QRZ0061-2R2	2.2	1/4W	FUSIBLE	D
	R301	QRD161J-105	1M	1/6W	CARBON	
	R302	QRD161J-221	220	1/6W	CARBON	
	R303	QRD161J-104	100K	1/6W	CARBON	
	R304	QRD161J-101	100	1/6W	CARBON	
	R305	QRD161J-472	4.7K	1/6W	CARBON	
	R306	QRD161J-472	4.7K	1/6W	CARBON	
	R307	QRD161J-472	4.7K	1/6W	CARBON	
	R308	QRD161J-124	120K	1/6W	CARBON	
	R309	QRD161J-432	4.3K	1/6W	CARBON	
	R310	QRD161J-432	4.3K	1/6W	CARBON	
	R311	QRD161J-472	4.7K	1/6W	CARBON	
	R312	QRD161J-472	4.7K	1/6W	CARBON	
	R347	QRD161J-271	270	1/6W	CARBON	
	R348	QRD161J-271	270	1/6W	CARBON	
	R351	QRD161J-334	330K	1/6W	CARBON	
	R352	QRD161J-333	33K	1/6W	CARBON	
	R353	QRD161J-103	10K	1/6W	CARBON	
	R354	QRD14CJ-680S	68	1/4W	CARBON	B
	R354	QRD161J-680	68	1/6W	CARBON	D
	R355	QRD161J-684	680K	1/6W	CARBON	
	R361	QRD161J-221	220	1/6W	CARBON	
	R362	QRD161J-221	220	1/6W	CARBON	
	R363	QRD161J-682	6.8K	1/6W	CARBON	
	R364	QRD161J-682	6.8K	1/6W	CARBON	
	R401	QRD161J-123	12K	1/6W	CARBON	
	R402	QRD161J-181	180	1/6W	CARBON	
	R403	QRD161J-182	1.8K	1/6W	CARBON	
	R404	QRD161J-182	1.8K	1/6W	CARBON	
	R405	QRD161J-271	270	1/6W	CARBON	
	R406	QRD161J-182	1.8K	1/6W	CARBON	
	R407	QRV144F-3302	33	1/4W	M.FILM	
	R408	QRV144F-3302	33	1/4W	M.FILM	
	R409	QRD161J-183	18K	1/6W	CARBON	
	R410	QRD161J-562	5.6K	1/6W	CARBON	
	R411	QRD161J-183	18K	1/6W	CARBON	
	R412	QRD161J-471	470	1/6W	CARBON	
	R413	QRD161J-152	1.5K	1/6W	CARBON	
	R414	QRD161J-104	100K	1/6W	CARBON	
	R415	QRD161J-821	820	1/6W	CARBON	
	R416	QRD161J-103	10K	1/6W	CARBON	
	R417	QRD161J-471	470	1/6W	CARBON	

⚠ : SAFETY PARTS

Resistors

⚠	ITEM	PART NUMBER	DESCRIPTION			AREA
	R451	QRD161J-472	4.7K	1/6W	CARBON	
	R452	QRD161J-184	180K	1/6W	CARBON	
	R453	QRD161J-562	5.6K	1/6W	CARBON	
	R454	QRD161J-103	10K	1/6W	CARBON	
	R456	QRD161J-104	100K	1/6W	CARBON	
	R457	QRD161J-103	10K	1/6W	CARBON	
	R458	QRD161J-103	10K	1/6W	CARBON	
	R460	QRD161J-562	5.6K	1/6W	CARBON	
	R462	QRD161J-273	27K	1/6W	CARBON	
	R463	QRD161J-183	18K	1/6W	CARBON	
	R501	QRD161J-183	18K	1/6W	CARBON	
	R502	QRD161J-183	18K	1/6W	CARBON	
	R503	QRD161J-474	470K	1/6W	CARBON	
	R504	QRD161J-681	680	1/6W	CARBON	
	R505	QVZ3518-472	4.7K	0.1W	VARIABLE	
	R506	QRD161J-272	2.7K	1/6W	CARBON	
	R507	QRD161J-474	470K	1/6W	CARBON	
	R509	QVZ3518-224	220K	0.1W	VARIABLE	
	R510	QRD161J-223	22K	1/6W	CARBON	
	R511	QRD161J-103	10K	1/6W	CARBON	
	R512	QRD161J-103	10K	1/6W	CARBON	
	R513	QRD161J-562	5.6K	1/6W	CARBON	
	R514	QRD161J-562	5.6K	1/6W	CARBON	
	R515	QRD161J-562	5.6K	1/6W	CARBON	
	R516	QRD161J-562	5.6K	1/6W	CARBON	
	R517	QRD161J-183	18K	1/6W	CARBON	
	R518	QRD161J-155	1.5M	1/6W	CARBON	
	R519	QRD161J-183	18K	1/6W	CARBON	
	R520	QRD161J-154	150K	1/6W	CARBON	
	R521	QVZ3518-472	4.7K	0.1W	VARIABLE	
	R522	QRD161J-472	4.7K	1/6W	CARBON	
	R523	QRD161J-474	470K	1/6W	CARBON	
	R524	QRD161J-474	470K	1/6W	CARBON	
	R525	QRD161J-163	16K	1/6W	CARBON	
	R526	QRD161J-470	47	1/6W	CARBON	
	R527	QRD161J-104	100K	1/6W	CARBON	
	R528	QRD161J-104	100K	1/6W	CARBON	
	R529	QRD161J-102	1K	1/6W	CARBON	
	R530	QRD161J-183	18K	1/6W	CARBON	
	R531	QRD161J-104	100K	1/6W	CARBON	
	R532	QRD161J-122	1.2K	1/6W	CARBON	
	R533	QRD161J-272	2.7K	1/6W	CARBON	
	R534	QRD161J-181	180	1/6W	CARBON	
	R536	QRD161J-114	110K	1/6W	CARBON	
	R551	QRD161J-392	3.9K	1/6W	CARBON	
	R552	QRD161J-392	3.9K	1/6W	CARBON	
	R553	QRD161J-274	270K	1/6W	CARBON	
	R554	QRD161J-224	220K	1/6W	CARBON	
	R555	QVZ3518-104	100K	0.1W	VARIABLE	
	R557	QRD161J-102	1K	1/6W	CARBON	
	R558	QRD161J-393	39K	1/6W	CARBON	
	R559	QRD161J-471	470	1/6W	CARBON	
	R560	QRD161J-333	33K	1/6W	CARBON	
	R561	QRD161J-822	8.2K	1/6W	CARBON	
	R562	QRD161J-154	150K	1/6W	CARBON	
	R563	QRD161J-470	47	1/6W	CARBON	
	R567	QRD161J-125	1.2M	1/6W	CARBON	
	R568	QRD161J-470	47	1/6W	CARBON	
	R569	QRD161J-473	47K	1/6W	CARBON	
	R570	QRD161J-272	2.7K	1/6W	CARBON	
	R571	QRD161J-472	4.7K	1/6W	CARBON	
	R572	QRD161J-104	100K	1/6W	CARBON	
	R573	QRD161J-562	5.6K	1/6W	CARBON	
	R574	QRD161J-564	560K	1/6W	CARBON	
	R575	QRD161J-564	560K	1/6W	CARBON	
	R576	QRD161J-104	100K	1/6W	CARBON	
	R577	QRD161J-562	5.6K	1/6W	CARBON	
	R579	QRD161J-104	100K	1/6W	CARBON	
	R580	QRD161J-103	10K	1/6W	CARBON	
	R581	QRD161J-103	10K	1/6W	CARBON	
	R582	QRD161J-183	18K	1/6W	CARBON	
	R583	QRD161J-155	1.5M	1/6W	CARBON	
	R585	QRD161J-183	18K	1/6W	CARBON	
	R589	QRD161J-822	8.2K	1/6W	CARBON	
	R601	QRD161J-183	18K	1/6W	CARBON	
	R602	QRD161J-272	2.7K	1/6W	CARBON	
	R603	QRD161J-391	390	1/6W	CARBON	
	R604	QRD161J-221	220	1/6W	CARBON	
	R605	QRD161J-152	1.5K	1/6W	CARBON	
	R606	QRD161J-561	560	1/6W	CARBON	
	R607	QRD161J-561	560	1/6W	CARBON	
	R608	QRD161J-562	5.6K	1/6W	CARBON	
	R609	QRD161J-152	1.5K	1/6W	CARBON	
	R610	QRD161J-271	270	1/6W	CARBON	
	R611	QRD167J-471	470	1/6W	CARBON	

⚠ : SAFETY PARTS

Resister

⚠	ITEM	PART NUMBER	DESCRIPTION			AREA
	R651	QRD161J-103	10K	1/6W	CARBON	
	R652	QRD161J-272	2.7K	1/6W	CARBON	
	R653	QRD161J-101	100	1/6W	CARBON	
	R656	QRD161J-271	270	1/6W	CARBON	
	R657	QRD161J-103	10K	1/6W	CARBON	
	R658	QRD161J-562	5.6K	1/6W	CARBON	
	R659	QRD161J-103	10K	1/6W	CARBON	
	R660	QRD161J-682	6.8K	1/6W	CARBON	
	R661	QRD161J-103	10K	1/6W	CARBON	
	R663	QRD161J-471	470	1/6W	CARBON	
	R701	QRD161J-563	56K	1/6W	CARBON	
	R702	QRD161J-563	56K	1/6W	CARBON	
	R703	QRD161J-104	100K	1/6W	CARBON	
	R704	QRD161J-104	100K	1/6W	CARBON	
	R705	QRD161J-470	47	1/6W	CARBON	
	R801	QRD161J-184	180K	1/6W	CARBON	
	R802	QRD161J-274	270K	1/6W	CARBON	
	R803	QRD161J-123	12K	1/6W	CARBON	
	R804	QRD161J-184	180K	1/6W	CARBON	
	R805	QRD161J-562	5.6K	1/6W	CARBON	
	R806	QRD161J-392	3.9K	1/6W	CARBON	
	R807	QRD161J-470	47	1/6W	CARBON	
	R808	QRD161J-103	10K	1/6W	CARBON	
	R809	QRD161J-182	1.8K	1/6W	CARBON	
	R810	QRD161J-821	820	1/6W	CARBON	
	R811	QRD161J-184	180K	1/6W	CARBON	
	R812	QRD161J-183	18K	1/6W	CARBON	
	R813	QRD161J-273	27K	1/6W	CARBON	
	R851	QRD161J-684	680K	1/6W	CARBON	
	R852	QRD161J-684	680K	1/6W	CARBON	
	R853	QRD161J-104	100K	1/6W	CARBON	
	R854	QRD161J-470	47	1/6W	CARBON	
	R855	QRD161J-563	56K	1/6W	CARBON	
	R856	QRD161J-473	47K	1/6W	CARBON	
	R857	QRD161J-472	4.7K	1/6W	CARBON	
	R858	QRD161J-2R2	2.2	1/6W	CARBON	
	RA601	QRB045J-472	4.7K	4W	ARRAY	

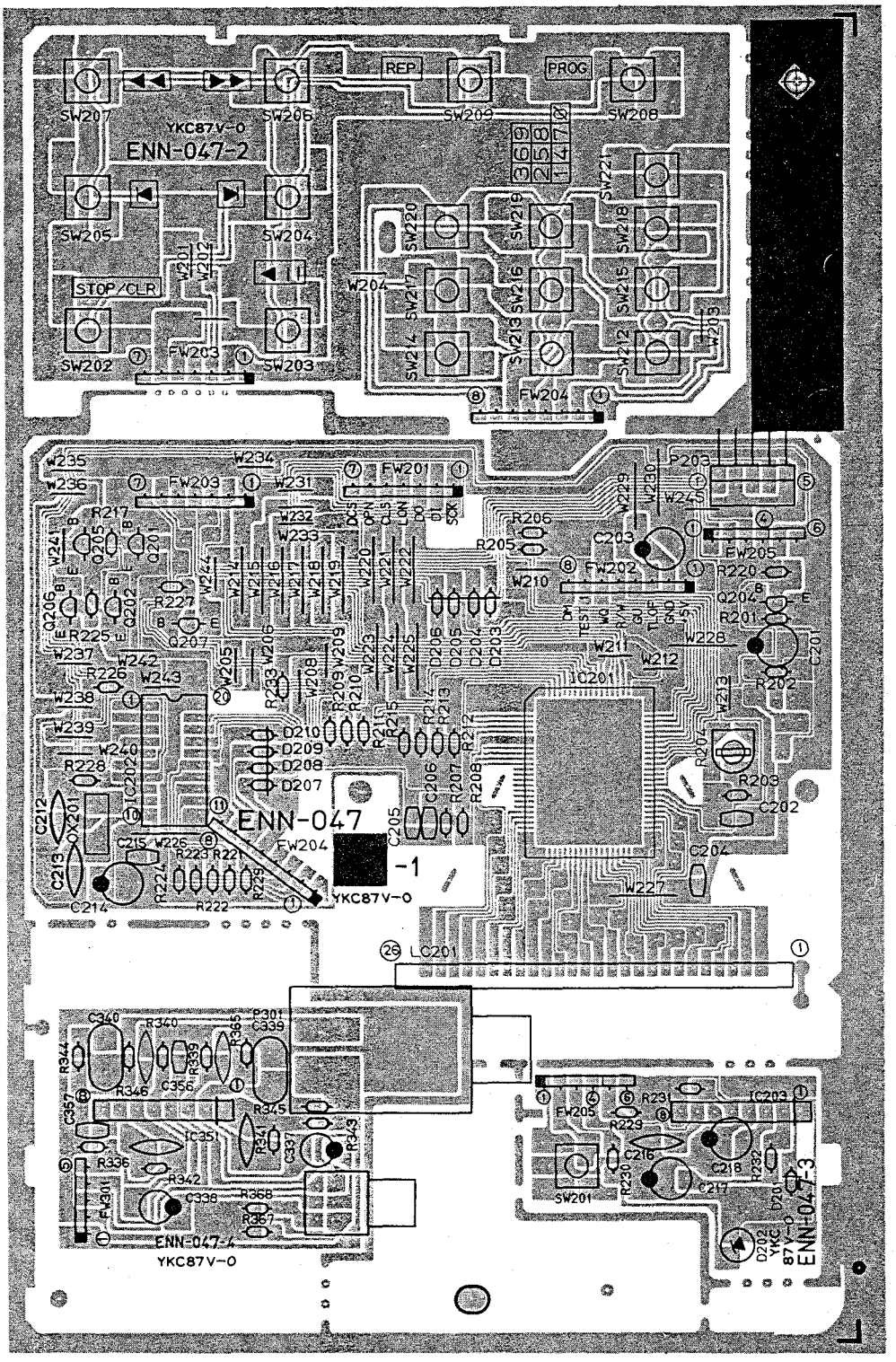
⚠ : SAFETY PARTS

Others

⚠	ITEM	PART NUMBER	DESCRIPTION	AREA
		EWT011-078	TERMINAL WIRE	
		E11296-101	CIRCUIT BOARD	
		E45524-002	FUSE CLIP	
		PH-0125-M	HEAT SINK	
	L401	ENZ3001-002	OSC COIL	
	P101	EMV7112-006	PLUG ASSY	
	P102	EMV7112-007	PLUG ASSY	
	P103	EMV7112-008	PLUG ASSY	
	P301	EMN00TV-201A	PIN JACK ASSY	
	P303	QMS3533-001	JACK ASSY	
	P304	EMV7112-005	PLUG ASSY	
	P501	EMV5109-012A	12P PLAG ASSY	
	P502	EMV5109-004A	4P PLAG ASSY	
	P801	QMV5005-006K	6P PLAG ASSY	
⚠	CP101	ICP-N20	ICP	
⚠	CP102	ICP-N20	ICP	
	OS301	ECX0086-436EC	RESONATOR	

⚠ : SAFETY PARTS

■ ENN-047B Front PC Board Ass'y



Transistors

⚠	ITEM	PART NUMBER	DESCRIPTION	MAKER	AREA
	Q201	DTC144EN	SILICON	ROHM	
	Q202	DTA114YN	SILICON	ROHM	
	Q204	2SA933(R,S)	SILICON	ROHM	
	Q205	DTC144EN	SILICON	ROHM	
	Q206	DTA114YN	SILICON	ROHM	

⚠ : SAFETY PARTS

Ics

⚠	ITEM	PART NUMBER	DESCRIPTION	MAKER	AREA
	IC201	UPD7514G-209-12	I.C.	NEC	
	IC202	UPD7564CS-42	I.C.	NEC	
	IC203	CX20106A	I.C.		
	IC351	M5218L	I.C.	MITSUBISHI	

⚠ : SAFETY PARTS

Dioders

⚠	ITEM	PART NUMBER	DESCRIPTION	MAKER	AREA
	D201	PH302C	SILICON	NEC	
	D202	SLH-34VC50F	L.E.D.	ROHM	
	D203	1SS133	SILICON	ROHM	
	D204	1SS133	SILICON	ROHM	
	D205	1SS133	SILICON	ROHM	
	D206	1SS133	SILICON	ROHM	
	D207	1SS133	SILICON	ROHM	
	D208	1SS133	SILICON	ROHM	
	D209	1SS133	SILICON	ROHM	
	D210	1SS133	SILICON	ROHM	
	D211	1SS133	SILICON	ROHM	
	D212	1SS133	SILICON	ROHM	

⚠ : SAFETY PARTS

Capacitors

⚠	ITEM	PART NUMBER	DESCRIPTION			AREA
	C201	QETB1AM-476	47MF	10V	ELECTRO	
	C202	QCSB1HJ-470	47PF	50V	CERAMIC	
	C203	QETB1AM-476	47MF	10V	ELECTRO	
	C204	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C205	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C206	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C212	QCS21HJ-101	100PF	50V	CERAMIC	
	C213	QCS21HJ-101	100PF	50V	CERAMIC	
	C214	QETB1HM-475	4.7MF	50V	ELECTRO	
	C215	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C216	QCS21HJ-471	470PF	50V	CERAMIC	
	C217	QEK61HM-105	1MF	50V	ELECTRO	
	C218	QEK61HM-225	2.2MF	50V	ELECTRO	
	C337	QETB1HM-105	1MF	50V	ELECTRO	
	C338	QETB1HM-105	1MF	50V	ELECTRO	
	C339	QFN81HJ-103	0.01MF	50V	MYLAR	
	C340	QFN81HJ-103	0.01MF	50V	MYLAR	
	C356	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C357	QCHB1EZ-223	0.022MF	25V	CERAMIC	

⚠ : SAFETY PARTS

Resister

⚠	ITEM	PART NUMBER	DESCRIPTION			AREA
	R201	QRD161J-152	1.5K	1/6W	CARBON	
	R202	QRD161J-332	3.3K	1/6W	CARBON	
	R203	QRD161J-303	30K	1/6W	CARBON	
	R204	QVZ3518-472	4.7	0.1W	VARIABLE	
	R205	QRD161J-333	33K	1/6W	CARBON	
	R206	QRD161J-333	33K	1/6W	CARBON	
	R207	QRD161J-103	10K	1/6W	CARBON	
	R208	QRD161J-103	10K	1/6W	CARBON	
	R209	QRD161J-472	4.7K	1/6W	CARBON	
	R210	QRD161J-472	4.7K	1/6W	CARBON	
	R211	QRD161J-472	4.7K	1/6W	CARBON	
	R212	QRD161J-473	47K	1/6W	CARBON	
	R213	QRD161J-473	47K	1/6W	CARBON	
	R214	QRD161J-473	47K	1/6W	CARBON	
	R215	QRD161J-473	47K	1/6W	CARBON	
	R217	QRD161J-472	4.7K	1/6W	CARBON	
	R220	QRD161J-103	10K	1/6W	CARBON	
	R221	QRD161J-103	10K	1/6W	CARBON	
	R222	QRD161J-103	10K	1/6W	CARBON	
	R223	QRD161J-103	10K	1/6W	CARBON	
	R224	QRD161J-103	10K	1/6W	CARBON	
	R225	QRD161J-472	4.7K	1/6W	CARBON	
	R228	QRD161J-682	6.8K	1/6W	CARBON	
	R229	QRD161J-473	47K	1/6W	CARBON	
	R230	QRD161J-331	330	1/6W	CARBON	
	R231	QRD167J-224	220K	1/6W	CARBON	
	R232	QRD161J-4R7	4.7	1/6W	CARBON	
	R233	QRD161J-392	3.9K	1/6W	CARBON	
	R234	QRD161J-222	2.2K	1/6W	CARBON	
	R235	QRD148J-102S	1K	1/4W	CARBON	
	R339	QRD161J-473	47K	1/6W	CARBON	
	R340	QRD161J-473	47K	1/6W	CARBON	
	R341	QRD161J-473	47K	1/6W	CARBON	
	R342	QRD161J-473	47K	1/6W	CARBON	
	R343	QRD161J-680	68	1/6W	CARBON	
	R344	QRD161J-680	68	1/6W	CARBON	
	R345	QRD161J-390	39	1/6W	CARBON	
	R346	QRD161J-390	39	1/6W	CARBON	
	R365	QRD161J-223	22K	1/6W	CARBON	
	R366	QRD161J-223	22K	1/6W	CARBON	
	R367	QRD161J-561	560	1/6W	CARBON	
	R368	QRD161J-561	560	1/6W	CARBON	
	VR351	QVAB99A-E54B	50K		VARIABLE	B

⚠ : SAFETY PARTS

Others

⚠	ITEM	PART NUMBER	DESCRIPTION	AREA
	LC201	ELU0002-020	LCD PANEL	
		E11297-121	CIRCUIT BOARD	
		E3400-373	SHIELD COVER	
		E73267-001	SPACER PLAG ASSY	
	P201	QMV5004-005K	PLAG ASSY	
	P301	QMS6302-128	JACK ASSY	
	OX201	ECX0000-700KS	RESONATOR	
	SW201	ESP0001-007	PUSH SWITCH	
	SW202	ESP0001-007	PUSH SWITCH	
	SW203	ESP0001-007	PUSH SWITCH	
	SW204	ESP0001-007	PUSH SWITCH	
	SW205	ESP0001-007	PUSH SWITCH	
	SW206	ESP0001-007	PUSH SWITCH	
	SW207	ESP0001-007	PUSH SWITCH	
	SW208	ESP0001-007	PUSH SWITCH	
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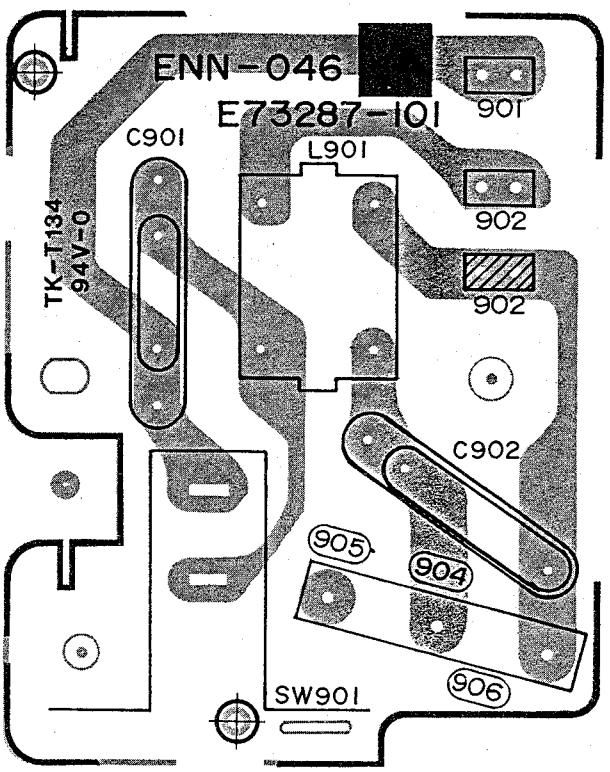
	SW214	ESP0001-007	PUSH SWITCH	
	SW215	ESP0001-007	PUSH SWITCH	
	SW216	ESP0001-007	PUSH SWITCH	
	SW217	ESP0001-007	PUSH SWITCH	
	SW218	ESP0001-007	PUSH SWITCH	
	SW219	ESP0001-007	PUSH SWITCH	
	SW220	ESP0001-007	PUSH SWITCH	
	SW221	ESP0001-007	PUSH SWITCH	

⚠ : SAFETY PARTS

■ ENN-046□ Primary PC Board Ass'y

Note: ENN-046□ varies according to the areas employed. See note (1) when placing an order.



Note (1)

P.C. Board Ass'y	Designated Areas
ENN-046Ⓐ	U.S.A., Canada
ENN-046Ⓑ	U.S. Military Market & Other Countries
ENN-046Ⓒ	Europe, Australia, Spain,
ENN-046ⒹBS	U.K.
ENN-046Ⓔ	West Germany

Capacitors

⚠	ITEM	PART NUMBER	DESCRIPTION		AREA
	C901	QCZ9018-103	0.01MF	CERAMIC	B
	C901	QCZ9038-103	0.01MF	CERAMIC	A
	C901	QCZ9038-103	0.01MF	CERAMIC	C
	C901	QCZ9038-103BS	0.01MF	CERAMIC	DBS
	C901	QCZ9038-103	0.01MF	CERAMIC	E
	C902	QFZ9010-223	0.022MF	MYLAR	C
	C902	QFZ9019-223	0.022MF	MYLAR	A
	C902	QFZ9020-223	0.022MF	MYLAR	B
	C902	QFZ9020-223BS	0.022MF	MYLAR	DBS
	C902	QFZ9010-223	0.022MF	MYLAR	E

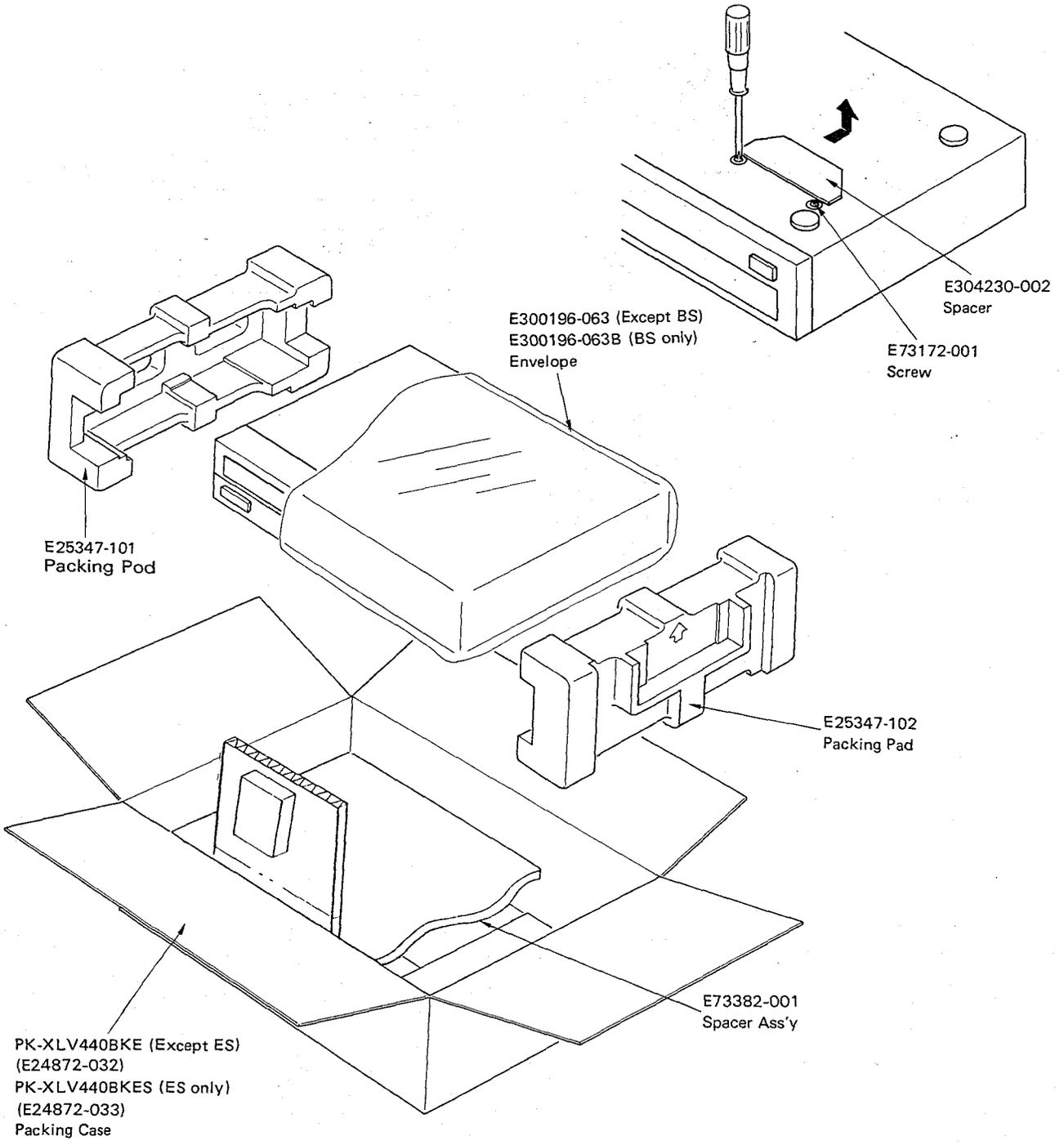
⚠ : SAFETY PARTS

Others

⚠	ITEM	PART NUMBER	DESCRIPTION	AREA
		E65508-002	TAB	
		E67764-203	TERMINAL ASSY	
		E73287-101	CIRCUIT BOARD	A
		E73287-101	CIRCUIT BOARD	B
		E73287-101	CIRCUIT BOARD	C
		E73287-101BS	CIRCUIT BOARD	DBS
		E73287-101	CIRCUIT BOARD	E
⚠	SW901	QSP1106-004	PUSH SWITCH	A
⚠	SW901	QSP1106-004	PUSH SWITCH	B
⚠	SW901	QSP1106-004	PUSH SWITCH	C
⚠	SW901	QSP1106-004BS	PUSH SWITCH	DBS
⚠	SW901	QSP1106-004	PUSH SWITCH	E
	L901	ENZ5002-004	LINE FILTER	A
	L901	ENZ5002-004	LINE FILTER	B
	L901	ENZ5002-004	LINE FILTER	C
	L901	ENZ5002-004BS	LINE FILTER	DBS
	L901	ENZ5002-004	LINE FILTER	

⚠ : SAFETY PARTS

Packing Materials and Part Numbers



Accessories List

Accessories List

⚠	Parts Number	Parts Name	Q'ty	Description	Areas
	E30580-1347A	Instruction Book	1		J, C, P, PG, E, A, G, ES, U
	E30580-1347ABS	Instruction Book	1		BS
	BT20047C	Warranty Card	1		J, P, PG
	BT20025H	Warranty Card	1		C
	BT20029C	Warranty Card	1		A
	BT20060	Warranty Card	1		BS
	BT20064	Warranty Card	1		G
	BT20046B	Service Information	1		J, P, PG
	BT20044E	Safety Instruction Sheet	1		J
	BT20071A	Service Center	1		C
	BT20066	EEC Agency	1		G, BS
	E70570-001	Keeping Card	1		J
	E70571-001	Keeping Card	1		J
	E70572-001	Keeping Card	1		J
	A76332-2	Keeping Card	1		J
	E35497-019	Caution Sheet	1	220 V	PG, U
	E35497-017	Caution Sheet	1	110 V	P
⚠	E04056	Siemens Plug	1		PG, U
	E66416-003	Envelope	1	for Warranty Card	J
	E41202-004	Envelope	1	for Siemens Plug	PG, U
	E300196-010	Envelope	1	for Instruction Book	J, C, P, PG, E, A, G, ES, U
	E300196-010B	Envelope	1	for Instruction Book	BS
	EWP302-101	Signal Cord	1	for Output	
	EWP805-001	1P Plug Cord	1	for DCS	
	RM-SX440U	Remote Control Unit	1		
	UM-3DJ-2P	Battery	2		

⚠ : Safety Parts

The Marks for Designated Areas		
J . . . . . U.S.A.	E . . . . . Europe	ES . . . . . Spain
C . . . . . Canada	G . . . . . West Germany	P, PG . . . . . U.S. Military Market
A . . . . . Australia	BS . . . . . U.K.	U . . . . . Other Countries
		No mark indicates all areas.

JVC Service Bulletin

No.: JSB-ST-304
Date: Oct. 14, 1986

SUBJECT: Mistracking after approx 1 minute

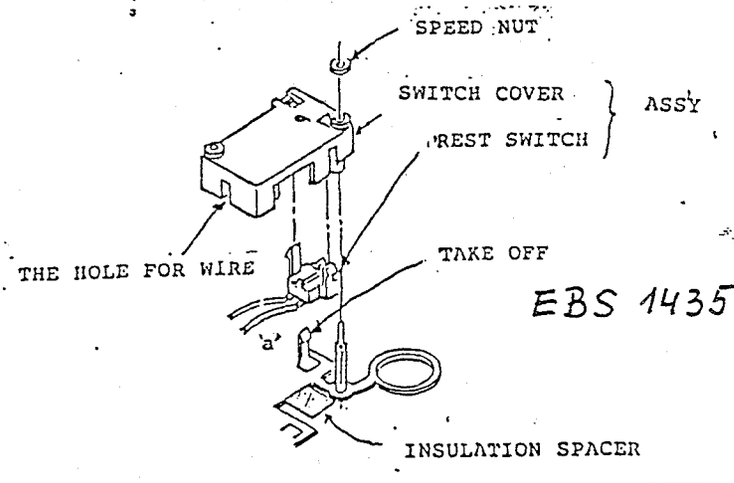
(MODEL NO. CONCERNED: XL-V22, XL-V330, XL-V440, XL-V220)

We have received the information from some marcket about above matter.
Therefore, we inform you the remedy.
Please refer to the following when this defect occurs.

Causes: When the following three causes have been combined together under bad condition, the mistracking occurs.
1. Torque ripple of rest switch.
2. Backlash of rack gear.
3. Amount of grease on the pick up rail.

After several examination, this matter has been solved to improve rest switch.
We inform you the following remedy.

Remedy: Change rest switch
1. Remove the rest switch and solder the wire to the new rest switch.
2. Take off the clamper 'a'.
3. Put the spacer(E73898-001) on the pick up base to prevent short circuit. (As shown the figure)



EBS 1435 E-1 switch ki